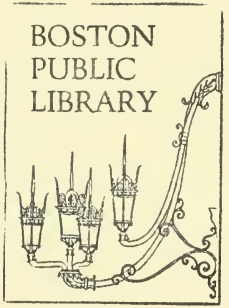
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HARBOR POINT

(REDEVELOPMENT OF THE
COLUMBIA POINT HOUSING PROJECT)

FINAL
ENVIRONMENTAL IMPACT REPORT
EOEA #5076

TECHNICAL APPENDICES

VOLUME 1 OF 2

BOSTON, MASSACHUSETTS

TECHNICAL APPENDICES

PART 1 of 2

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APPENDIX A

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OF

STUDY REPORTS

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APPENDIX B

COLUMBIA POINT

RESIDENT REHOUSING AGREEMENT

COLUMBIA POINT RESIDENT REHOUSING AGREEMENT

The Columbia Point Community Task Force, Inc. (Task Force), the elected representative of Columbia Point residents, the Boston Housing Authority (BHA), and the Boston Redevelopment Authority (BRA) are working together to realize the revitalization and redevelopment of Columbia Point. An essential part of that redevelopment is to ensure that all current residents who wish to do so can continue to live at Columbia Point in a new or renovated unit, and that such units shall be comparable to and uniformly mixed with units for other income groups.

1. ACTIONS TO BE TAKEN BY THE TASK FORCE, BRA, AND BHA

The Task Force, BRA and BHA agree to take all necessary and appropriate actions to ensure that current residents (as used herein, the term "residents" shall mean all residents of Columbia Point who comply with the conditions set forth below) will have the opportunity to remain at Columbia Point. These actions shall specifically include, but not be limited to, the following. The BHA agrees not to spend the $10 million earmarked for Columbia Point under the Urban Initiatives program on any housing plan, or to sell or lease for redevelopment any of its property at Columbia Point, unless all residents are guaranteed the opportunity to live in new or renovated units at Columbia Point. The Task Force agrees not to approve any housing development program that fails to assure that current residents will be offered new or renovated units at Columbia Point. The Task Force agrees that in its capacity as a co-developer it will provide a guarantee that all residents will be offered a new or renovated unit at Columbia Point. The BRA agrees not to

propose, approve or adopt any urban renewal plan under M.G.L. c. 121B, any c. 121A agreement, any land disposition agreement, or any other plan for the residential housing redevelopment of Columbia Point, unless such urban renewal plan, 121A agreement, other plan or land disposition agreement contains a guarantee that all residents at Columbia Point will be offered new or renovated housing at Columbia Point.

2. CONDITIONS OF THE GUARANTEE

The guarantee of rehousing will be subject to the following conditions and restrictions.

a. The guarantee will cover residents who, as of the date of this agreement, are recognized by the BHA as lease holders at Columbia Point or heads of currently doubled-up households who are scheduled by the BHA to move into their own units at Columbia Point.

Immediately after execution of this agreement, a list of the residents to whom the guarantee will apply will be compiled by the three parties. To verify the accuracy of this list, all residents on it will be notified that they are entitled to a guarantee and will be required to acknowledge receipt of the notice. Residents not listed who can establish their right to a guarantee will be added to the final list of residents entitled to a guarantee. After verification by the BHA, this list will constitute the list of certified residents eligible for the guarantee.

b. A resident will not receive a guarantee, or the guarantee will be void, if a resident moves from Columbia

Point, unless the BHA, BRA or the codevelopers relocate her/him because of the redevelopment or because there is no decent, safe, or sanitary apartment available for her/him at Columbia Point. Any resident relocated temporarily or permanently during the redevelopment process shall be entitled to relocation benefits under applicable law, including the Federal Uniform Relocation Act, 42 U.S.C. 4601, or the state relocation act, M.G.L. c. 79A, if applicable or to such other benefits as may be agreed to among the parties and approved by HUD.

c. The resident must abide by the provisions of her/his current BHA lease or future BHA lease agreements.

d. The unit the resident will be offered will be appropriate to the household income (rents shall not exceed 25% of gross income or other applicable HUD guidelines for public housing rents if the household income falls within public housing eligibility guidelines, or guidelines for other subsidized housing rents if the household income falls outside of public housing guidelines but within such subsidized housing guidelines) and other eligibility qualifications such as household size or age.

e. If the resident household's income exceeds eligibility for subsidized housing before the household has been offered an appropriate new or renovated unit at Columbia Point, the guarantee shall remain in effect (i.e., the household will be offered a unit appropriate to its income and other eligibility qualifications). If the resident household's income exceeds eligibility for subsidized housing after the household has

moved to an appropriate unit, the household shall not be subject to eviction proceedings because of income. If the household is required by law to move from its unit, however, the household shall have priority for residency in market rent units on the Columbia Point peninsula.

f. In case of death, divorce, separation or other long-term absence of the individual leaseholder(s), the guarantee may be transferred upon notification to the BHA to an otherwise eligible adult who has been recorded in BHA records as a bona fide Columbia Point household member.

g. The guarantee will not be transferable to any other resident or non-resident nor to any relative except as above.

h. A household's guarantee will continue in effect until that household has been offered an appropriate new or renovated unit at Columbia Point.

i. All disputes concerning the rights of specific residents under the guarantee will be resolved pursuant to the BHA grievance procedure.

j. No special conditions of eligibility other than those specified herein shall be established, by lease or otherwise, as a condition for maintaining the guarantee.

3. CONDITIONS OF CONTINUED RESIDENCY

The Task Force, BHA and BRA and their successors in interest shall not discriminate against holders of the guarantee in the terms, conditions or privileges of rental or sale of, or in the provision of services or facilities in connection with, new or renovated units at Columbia Point. This provision

shall be included in any urban renewal plan under c. 121B, c. 121A agreement, and/or other redevelopment plan for Columbia Point and in any document executed by the BHA or BRA disposing of or leasing real property for residential use at Columbia Point.

4. REPRESENTATIONS, ENFORCEABILITY, ETC.

The BRA represents that this agreement has been reviewed and approved by the Mayor of the City of Boston. The Task Force, BRA and BHA represent that the representatives named below have been duly authorized to sign this agreement in behalf of the respective parties and to bind them and their successors in interest. The Task Force, BRA and BHA further agree that this agreement shall be legally enforceable by any of the parties hereto or their successors in interest, and by residents of Columbia Point.

5. TERMINATION

This agreement shall be terminated only in accordance with the provisions of this section. If any one of the parties wishes to terminate this agreement, that party shall so state in writing to each of the other parties. The parties may thereupon agree in writing to terminate this agreement. If all parties do not agree to terminate, the parties shall settle the disagreement by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Associat The agreement shall be terminated only if the arbitration panel concludes in writing, after reasonable investigation, that the development objectives established by the Columbia Point Peninsul Redevelopment Agreement cannot be carried out by the three partie

In this event the parties agree that any new or renovated housing developed on the peninsula by or through the approval of any of the three parties shall provide appropriate units for Columbia Point residents.

The parties acknowledge that the lists of current residents who are leaseholders (see Enclosure #1) or heads of currently doubled-up households (see Enclosure #2), and who are to be entitled to a new or renovated unit after the redevelopment of Columbia Point are incorporated by reference into this agreement and said lists will be further verified as provided by the notice provision of Section 2(a) o the Agreement.

BOSTON HOUSING AUTHORITY

BY _____
Lewis H. Spence
Receiver/Administrator

BOSTON REDEVELOPMENT AUTHORITY

BY _____
Robert J. Ryan, Director

COLUMBIA POINT COMMUNITY TASK FORCE INC.

BY _____
Terry Mair, President

Apr. 18, 1981
Date

The Department of Housing and Urban Development (HUD) recognizes and endorses the objectives of this agreement. HUD hereby agrees to cooperate with the Task Force, the BHA, and the BRA, in ensuring that current residents of Columbia Point will have the opportunity to remain permanently at Columbia Point as set forth above.

U.S. Department of Housing and Urban Development

By: _____
James DiPrete, Jr., Regional Administrator
9/3/82

APPENDIX C

REQUEST FOR DEVELOPER PROPOSALS

COLUMBIA POINT PENINSULA
REQUEST FOR DEVELOPER PROPOSALS

CITY OF BOSTON

KEVIN H. WHITE, MAYOR

BOSTON HOUSING AUTHORITY

BOSTON REDEVELOPMENT AUTHORITY

IN PARTNERSHIP WITH

COLUMBIA POINT COMMUNITY TASK FORCE, INC.

September 12, 1982

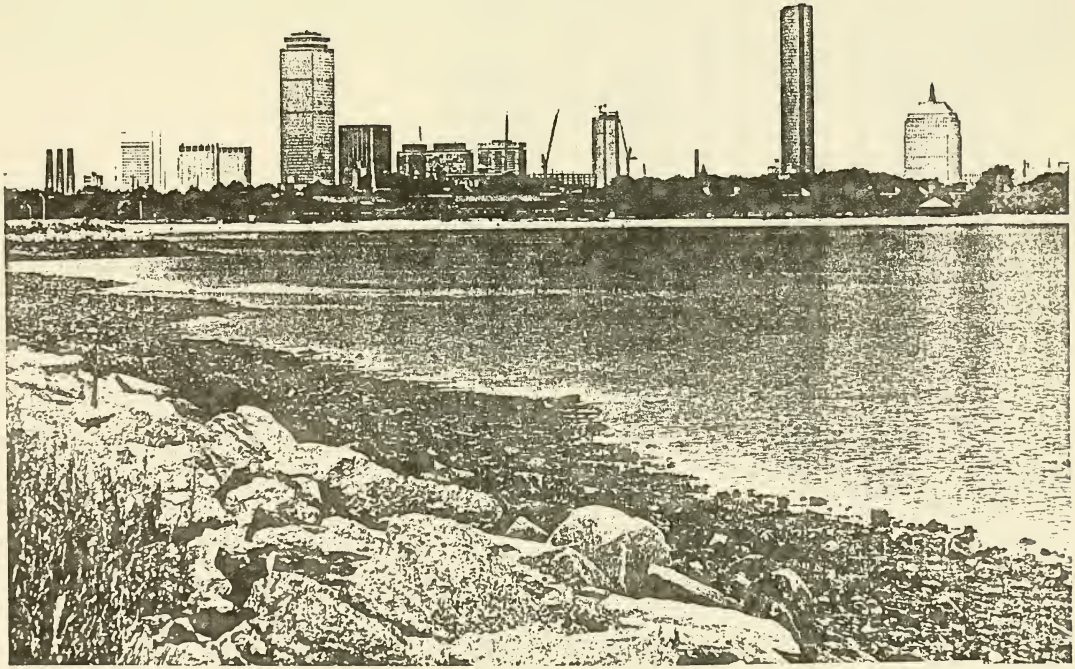


ILLUSTRATION 1.

VIEW FROM COLUMBIA POINT
TO BACK BAY

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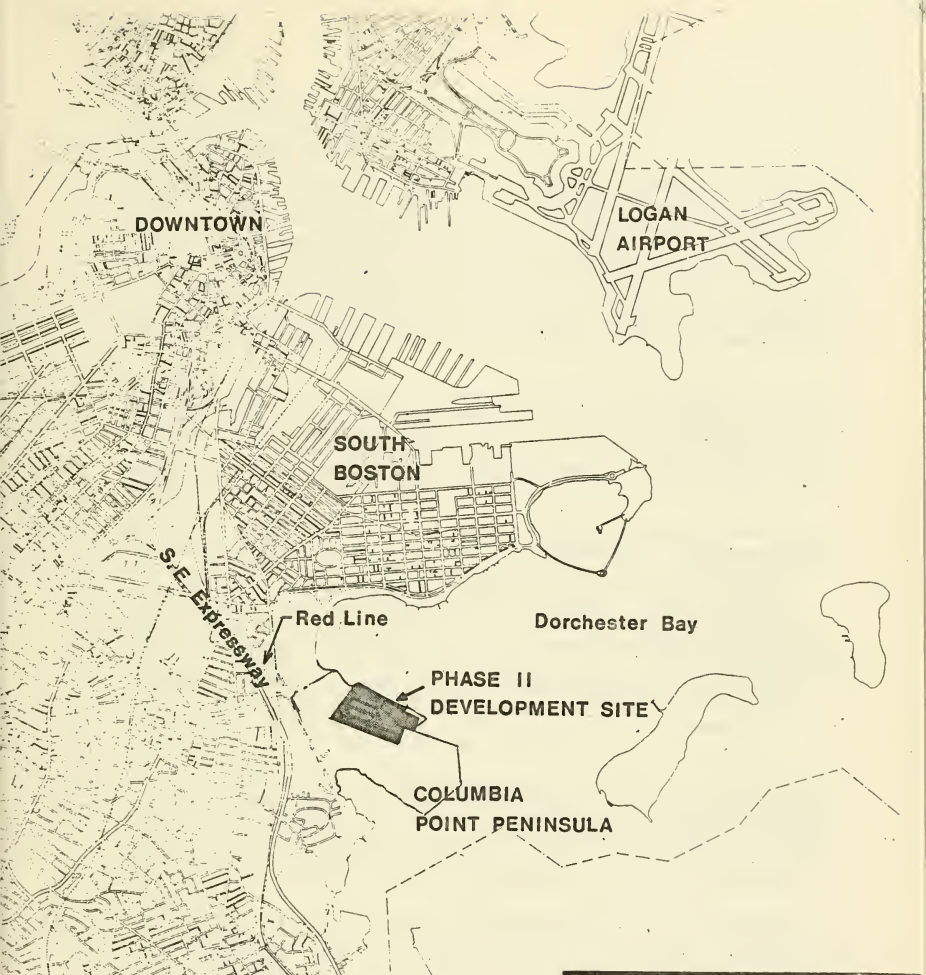
I. INTRODUCTION

The Columbia Point project presents an unusually exciting and large-scaled development opportunity: to create a new Boston neighborhood, consisting of a mixed-income residential community closely integrated with the already strong and growing institutional and commercial activities. The site for this new neighborhood is a peninsula just south of downtown Boston on a major highway with dramatic views of that area and Boston Harbor (See Map 1).

This Request for Developer Proposals offers the first residential parcel in the Columbia Point Peninsula Revitalization Program, a program which has been created jointly by the Boston Redevelopment Authority (BRA), Boston Housing Authority (BHA) and the Columbia Point Community Task Force, Inc. (Task Force). The overall program calls for the development of a new, mixed-income, racially integrated residential community with appropriate support facilities and the redevelopment of the Bayside Mall as a major exhibition center.

The development team selected for this phase would be responsible for the development and management of up to 1,600 units of new and renovated housing units for low, moderate and higher-income tenants and/or owners. The approximately 50-acre residential parcel being offered for development is owned in part by the BHA, and in part, by the City of Boston. The BHA land is the site of the Columbia Point public housing project. The City land is developed, in part, as a recreation area.

The selection process for the private developer of this parcel will be a competitive one, conducted by the BRA, BHA, and Task Force. It will be in two stages, the first a request for qualifications from all interested developers, after which the field will be narrowed to three to five finalists, and the second, a request to these finalists for full development proposals. The parties' schedule calls for the selection process to be completed by March 18, 1983. The conclusion of the process will be the tentative designation of the preferred developer by the BRA and BHA.



MAP NO. 1 LOCATION OF PROJECT IN BOSTON

COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM

II. PENINSULA REVITALIZATION PROGRAM

A. Columbia Point Peninsula

The location, accessibility, amenities and natural beauty of the Peninsula render it one of the most desirable sites for new development in the City of Boston. Situated only three miles from downtown, Columbia Point is merely a five minute drive via the Southeast Expressway or a ten minute subway ride on the Red Line from the City's center, and plans are underway for water taxi connections between downtown and Columbia Point. The 351-acre peninsula provides two miles of continuous shoreline primarily in public ownership, as well as spectacular views of the Back Bay and financial district skylines, the Harbor Islands and Dorchester Bay (see Map 2).

Several prestigious institutions have moved to the Peninsula in recent years, a testimonial to its tremendous potential for revitalization. The Kennedy family selected 9.5 waterfront acres of the Peninsula to house the John F. Kennedy Presidential Library. This dramatic building, designed by I.M. Pei, was dedicated and opened in October 1979, and welcomes approximately 700,000 visitors annually.

The University of Massachusetts-Harbor Campus is similarly located at the southeastern end of the Columbia Point Peninsula. Completed structures cover sixty of the 103 acres under University ownership, and include 1.6 million square feet of building space and 1,600 parking spaces, representing an investment of $160 million. The University's future plans include the construction of a third college and an Arts & Science Building. In addition, the Commonwealth of Massachusetts will start construction in Fall 1982 on its State Archives building between the Kennedy Library and UMass campus. The headquarters and printing plant of the Boston Globe and the computer operations center of the First National Bank, along with several other major businesses and institutions, are also located on the Peninsula.

The most positive recent development at Columbia Point is that plans are currently underway to revitalize the existing, nearly vacant Bayside Mall into the largest trade center in New England. The development of the Bayside Exposition Center, which will accommodate both trade and gate shows and permanent display and office space for the garment industry, will serve as a catalyst for the redevelopment of the entire Peninsula.

Despite these considerable assets, the redevelopment of Columbia Point will present a very real challenge to the selected developer and other involved parties. The most critical obstacle relates to the Columbia Point public housing project, the largest in New England. Of the 1,504 units built in 1954, approximately 400 are now occupied, and the vacant units have been seriously vandalized. The project as built was far too intensively developed and despite the vacancy rate, remains oppressive in its density and its derelict condition.

Despite Columbia Point's being surrounded on three sides by water, the design and construction of the public housing project hardly recognizes this relationship, and it is difficult to walk or drive to the water's edge. In fact, attractive and inviting public access to the shoreline at Columbia Point is virtually unavailable.

Further the natural geographic isolation of the Peninsula from the larger community is intensified by the indirect and not particularly attractive access to Mt. Vernon Street which serves as the housing project's only vehicular connection to the rest of the City.

B. Overall Peninsula Revitalization Program

The comprehensive program for Columbia Point will be carried out in three major phases. Upon completion it is intended to result in a mixed-income residential community for 6,000 to 8,000 residents, with supporting recreation, service and commercial facilities, and a major new exhibition center. This will occur largely on the one hundred plus acre development site north of Mt. Vernon Street owned now by several public and private entities. Through the creation of this new Boston neighborhood, the Peninsula and its residents will become an important ingredient in the life and activity for which the City is known. Columbia Point's long history of isolation, resulting from the various populations and purposes it has served, will be overcome by Peninsula-wide redevelopment for a broad-based constituency.

The Peninsula Revitalization Program includes the following elements:

- o a renovated Bayside Mall into a new multi-use exhibition facility;
- o 2,000 - 2,500 units of new and renovated mixed-income, racially integrated housing;
- o neighborhood shopping convenient to the residential area;
- o a new waterfront park and beach and other recreational and open space facilities;
- o public improvements to utilities and traffic and pedestrian circulation systems; and
- o a renovated Calf Pasture Pumping Station with restaurant/retail, community and visitor center functions.

Before describing in detail the offering being made in this Request for Developer Proposals (Phase II) - the following sections will deal with Phases I and III.

1. Phase I - Bayside Exposition Center

a. Overview

The first phase will be the conversion of the almost vacant Bayside Mall, owned by John Hancock Insurance Company, into the Bayside Exposition Center by Bayside Associates, a joint venture of Corcoran, Mullins, Jennison, Inc., and O'Connell Brothers Construction Company, Inc. This would be New England's largest facility for trade and gate shows and would include permanent showrooms for the women's garment

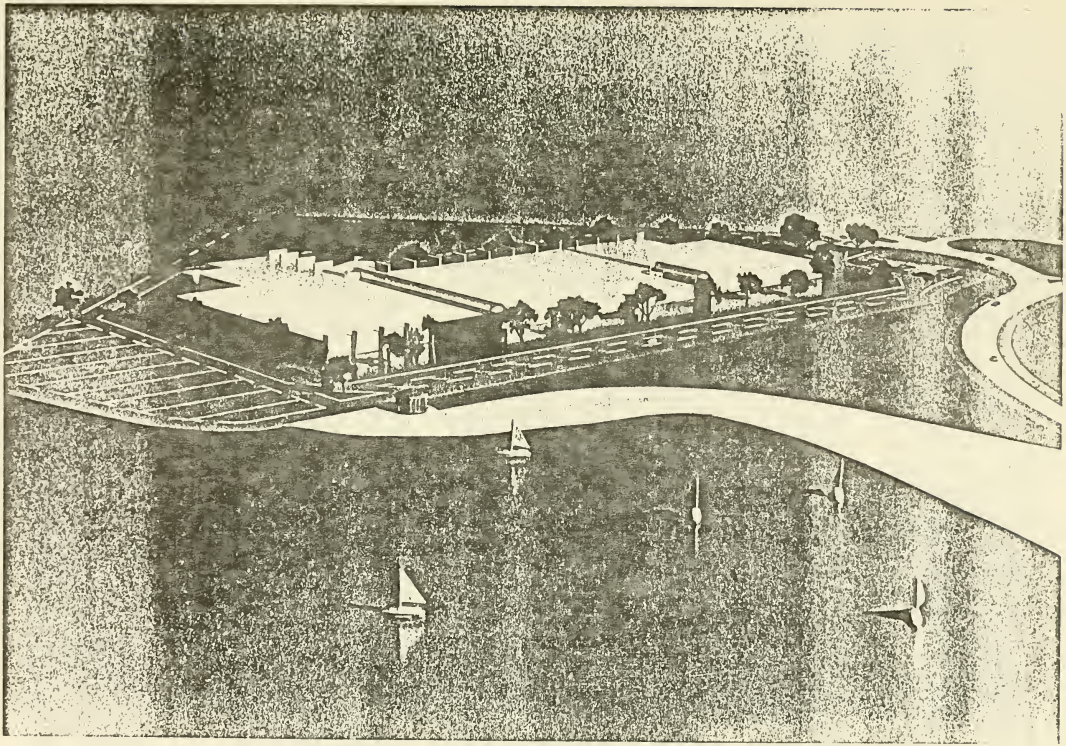


ILLUSTRATION 2.

MODEL OF BAYSIDE
EXPOSITION CENTER

industry as well. Bayside Exposition Center will represent a major investment in the Peninsula, generating considerable economic activity in terms of construction and permanent jobs, increased taxes, etc., from presently vacant buildings. Perhaps as important, Bayside will attract large numbers of visitors (for instance 30,000 per day for the New England Flower Show), thereby reducing Columbia Point's sense of isolation and the public perception of its being an unsafe place.

Improvements to the property will include the rehabilitation of the building shells and changes to the exterior of the buildings to emphasize their new uses. This will include extensive reconstruction of the entrances to make them appropriate for their new uses. The building interiors will be converted to suit their functions as showrooms, and exhibition spaces between the exhibition buildings will be covered and converted to interior corridors that can be used by vendors, food services, etc. The parking area will be rehabilitated as needed, extensively landscaped and lighted, and re-oriented to serve the property's new functions.

This project will represent a total investment of more than $17 million, including $13 million in private investment and $2.25 million in UDAG funds requested to complete the permanent financing. As soon as notification is made of the anticipated UDAG award on September 30, 1982, Bayside Associates intends to start full rehabilitation of the buildings and parking lot and to open the facility for the first gate show January 2, 1983 and for the garment industry in March. The Boston Teachers' Union, which rents one of the buildings, will continue to be located in that space.

As part of its UDAG application, filed July 30, 1982, the City has also requested a grant of $2.1 million to provide public improvements critical to the success of not only the Bayside Exposition Center, but the Phase II residential community as well. These public improvements will include new vehicular entrances into Columbia Point both from the north from Day Boulevard to Mt. Vernon Street and from the south from the UMass loop road to Mt. Vernon Street. The BRA acting as agent for the City would be responsible for the engineering, design and construction of these improvements.

b. Site Information

The Bayside Mall property encompasses 26 acres at the neck of Columbia Point with its entrance at the intersection of William Day Boulevard and Mt. Vernon Street. The mall itself includes four adjacent but free standing buildings which were originally built for retail stores. These single level buildings cover 280,000 square feet with the remainder of the site given over to paved parking.

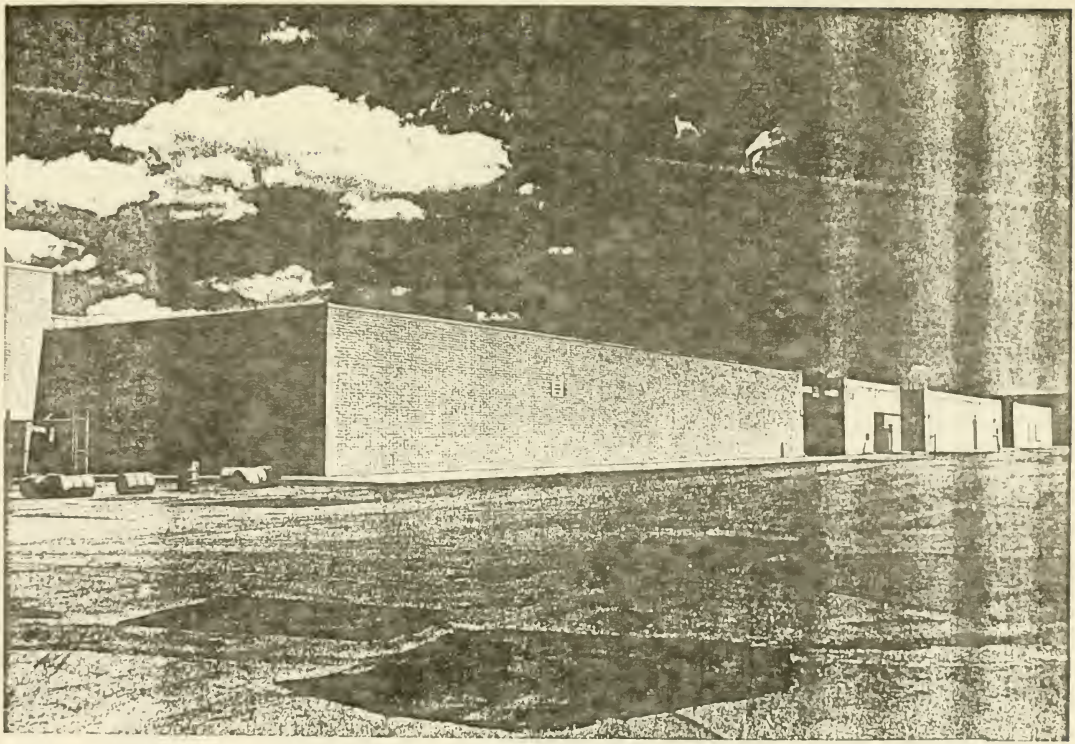


ILLUSTRATION 3.

BAYSIDE MALL BUILDINGS

2. Phase I - Uphams Corporation Parcels

Adjacent to the Phase II residential parcel are two parcels currently owned by the Uphams Corporation on which Bayside Associates (Phase I Exposition Center developers) has options to purchase. As both parcels are critical to the plans for a peninsula-wide revitalization effort, Bayside Associates has entered into an agreement with the BRA to ensure that development of the two sites conforms to the City's redevelopment plans.

This agreement establishes that the developer will convey to the Boston Redevelopment Authority a thirty-foot recreational easement on the waterfront parcel of about 3 acres which will continue the public waterfront use from the adjoining Metropolitan District Commission beach to the future waterfront recreational development on the Boston Housing Authority and City of Boston properties. The balance of the site, after the provision of approved landscaping, may be utilized for parking in support of the Bayside Exposition Center. If redeveloped in the future for other than parking use, the site must maintain a residential character.

The agreement also establishes that in a second phase the other parcel on Mt. Vernon Street will be developed for neighborhood commercial uses in conjunction with the housing development of Phase II. The developer will undertake to carry out a development program approved by the BRA in conjunction with the start of Phase II construction of at least 1,200 units. The plan calls for a minimum of 20,000 square feet of neighborhood commercial uses, including a food store and other retail outlets, and an additional minimum of 10,000 square feet for restaurants. If the developer should fail to meet this commitment, the BRA has the right to advertise for and select another developer for this parcel.

The success of the housing developed in Phase II is closely linked to the progress of the Bayside Exposition Center and to its developers' intentions to provide retail services between Bayside and the housing site. Bayside's redevelopment - creating a vital community element out of a vacant shopping center and bus parking lot, providing construction and permanent jobs for area residents, ending the peninsula's isolation and improving its image, dramatically upgrading the entrance to Mt. Vernon Street - presents critical assistance to the developer of the Phase II housing.

3. Phase III - Completion of Peninsula Revitalization Program

Following the completion of Phases I and II, the comprehensive revitalization program proposes in Phase III the further development of residential units (up to 900 units), additional commercial space (in the renovated Calf Pasture Pumping Station) and water-related recreational facilities (a marina and major waterfront park).

The proposed Phase III redevelopment site includes the Boston Water and Sewer Commissions's 9.5 acres of land at the eastern end of Mt. Vernon Street. Current plans call for the renovation of the

Calf Pasture Pumping Station there to house a restaurant, retail facilities and a community and visitors' center, as well as development of the balance of the site for residential use.

In addition, the University of Massachusetts owns two vacant parcels equalling approximately 13 acres at the eastern portion of the peninsula. The development of this site in a manner compatible with the rest of the peninsula will be pursued by the City with the University.

C. Urban Renewal Plan

It is contemplated by the parties that an Urban Renewal Plan will be put in place covering the entire Peninsula Revitalization Program area. It will be the function of this Plan to formally establish objectives and controls over the redevelopment area. In this fashion development compatible with the present Phase II redevelopment will be assured.

The plan would be instituted after tentative designation of the developer of Phase II. The Phase II development proposal approved as part of this designation would be incorporated into the Urban Renewal Plan and the objectives and controls for other properties would reflect the selected proposal.

III. PRESENT OFFERING - PHASE II RESIDENTIAL DEVELOPMENT

This section describes the site being offered by this kit, what the proposed program is and what the developer is expected to do.

A. Phase II Overview

Phase II of the Columbia Point project will be the development of up to 1,600 units of mixed-income housing on a 50-acre site adjacent to the Phase I Bayside Exposition Center. This phase will take place on land which is owned by the Boston Housing Authority and the City of Boston so the land can be made available in a timely fashion to a private developer.

Of the 1,600 units in this phase, 400 units will be low-income housing. The balance of the project is to contain 400 units of moderate-income housing and up to 800 units of market-rate housing with necessary supporting retail, recreational and community facilities.

1. Site Information

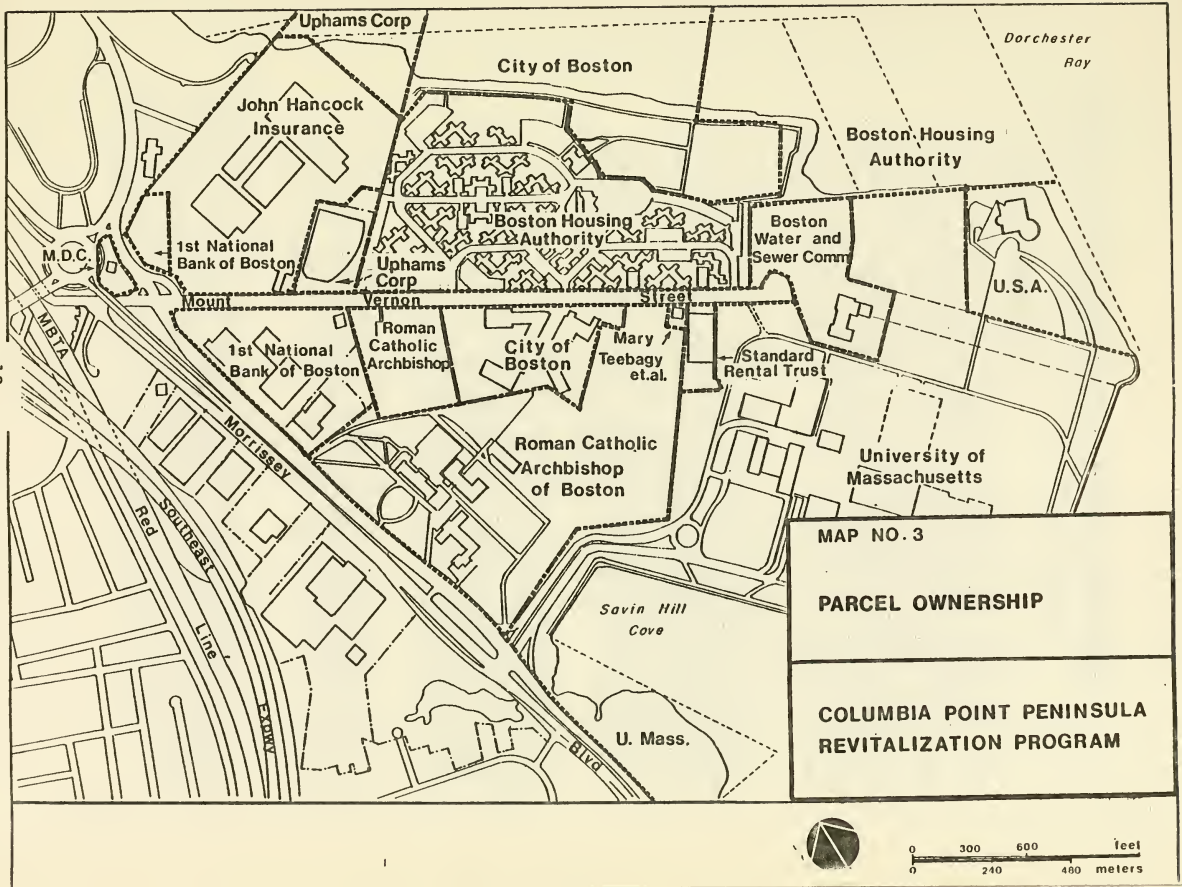
The Phase II development site which consists of two parcels encompassing approximately 50 acres is presently owned by the Boston Housing Authority and the City of Boston Public Facilities Department (see Map 3).

The BHA parcel of 37.7 uplands acres is the site of the Columbia Point housing project which consists of three 1-story, non-residential buildings and 1,504 housing units in 15 seven-story and 12 three-story buildings. However, only 25% of the existing units are currently occupied. Nine of the seven-story buildings and one three-story building are completely vacant and boarded and three others are partially boarded. The fourteen remaining residential buildings are occupied by approximately 1,500 people (360 families and 40 elderly or handicapped residents). An additional seventy-five apartments are occupied by 12 social service agencies.

The low-rise buildings are generally located along Mt. Vernon Street and the westerly portion of the site. The mid-rise buildings form a dense central core and continue to the easterly edge. The low-rise buildings and central mid-rise buildings, if occupied, house predominantly families. The mid-rise buildings on the eastern end of the development, Buildings #26 and #27, are partially occupied by the 40 elderly or handicapped residents (see Appendix A - Building Number Plan).

The buildings are all of reinforced concrete frame with masonry walls and brick exterior. They are linked by a city street system and are served by twenty-three at-grade parking areas with a total of 1,150 spaces.

An administrative building located on Mt. Vernon Street, containing office space, an assembly hall and a day-care center is one of the three non-residential project structures. The other two buildings


Uphams Corp
City of Boston
Dorchester Bay
John Hancock Insurance
Boston Housing Authority
Boston Housing Authority
Boston Water and Sewer Comm
M.D.C.
1st National Bank of Boston
Uphams Corp
Mount Vernon Street
U.S.A.
MBTA
1st National Bank of Boston
Roman Catholic Archbishop
City of Boston
Mary Teebagy et.al.
Standard Rental Trust
Morrissey Blvd
Roman Catholic Archbishop of Boston
University of Massachusetts
Red Southeast Line
Savin Hill Cove
U. Mass.
MAP NO. 3
PARCEL OWNERSHIP
COLUMBIA POINT PENINSULA REVITALIZATION PROGRAM
0 300 600 feet
0 240 480 meters

are a City of Boston Parks Department recreation building located on the eastern edge of the site abutting the city-owned park, and a nearby steam-heat oil-fired generation plant with four boilers that were renovated in 1978. All buildings on the site, except the recreation building, are served by the central heating plant via four underground loops. The distribution lines need substantial repair.

The City of Boston parcel of 13.5 uplands acres is presently the site of a waterfront park serving the housing development. Tennis and basketball courts, baseball fields and a tot-lot were developed for the residents on the western portion, but are not in good condition due to poor maintenance. The eastern portion of this parcel is essentially vacant.

2. Phase II Site Ownership

The public housing site is owned by the Boston Housing Authority and, with the exception of the recreation building, which is owned by the City of Boston Parks Department, all of the buildings are owned by the BHA. BHA is prepared to request concurrence of HUD in the sale or lease of all or any portion of its site and buildings to the developer, and to request permission for the demolition of portions of the project. HUD has indicated a willingness to concur both in the disposition of the project and its partial demolition, if these are necessary to achieve a viable development plan for Columbia Point.

The City of Boston parcel was formerly owned by the BHA and was deeded to the City of Boston's Public Facilities Department in 1970 so that the City could construct active recreation facilities. The deed provides that the BHA shall have a right to repossess the land if it is taken out of recreational and playground purposes. More important for purposes of determining the future use of this land, Article 97 of the Massachusetts Constitution would require a 2/3 vote of the state legislature if the land were to be taken out of recreational use because it was deeded to a public agency for such use. The difficulty of obtaining such a vote, however, would be minimized if an equivalent area of land elsewhere on the peninsula were provided.

The recreation facilities were constructed in 1973 and 1974 using Federal Bureau of Outdoor Recreation and City funds. If these facilities were to be removed and the land used for something other than recreation, the use would need to be approved by the U.S. Secretary of the Interior and equivalent substitute recreation facilities provided elsewhere.

B. Phase II Program Description and Developer's Responsibilities

The Phase II program consists of the following elements:

1. Residential Development

The developer will be expected to propose a mix of housing units which serves low income (public housing eligible), moderate-income (100% of SMSA Median Income), and upper-income (market rate) households. At least 400 low-income units, to be available at rents not greater than those paid by public housing tenants, must be provided and permanently maintained as a part of the redevelopment effort. If the developer obtains a commitment for low-income rent subsidy and that commitment expires during the life of the residential development, the developer (or other owner at that time) must demonstrate how he would propose to continue to provide 400 low-income housing units.

In carrying out this commitment to provide the low-income units, the developer will be required to meet the terms of the Columbia Point Resident Rehousing Agreement (see Appendix A for full text), which guarantees a new or renovated unit for the present Columbia Point public housing tenants. This agreement was entered into by the BHA, the BRA, and the Columbia Point Community Task Force, Inc., on April 8, 1981, and was formally endorsed by HUD on September 3, 1982. There are about 360 families and 40 elderly households which have signed this agreement and indicated their intention to live in the new community.*

It is the goal of the three parties that the current public housing tenants who are beneficiaries of the Rehousing Agreement will be accommodated in new or renovated housing units as soon as possible, and if applicable, in only one move. The developer will be expected to assist the BHA in implementing temporary relocation of current tenants, and (to the extent that other public funds are not available for this purpose) to pay relocation costs for moving the present tenants.

The parties' goal is also that the developer provide 400 units of moderate-income housing as an important element of this mixed-income community and the developer will be expected to expend his best efforts to provide these. The balance of the units, 400 to 800, will be market-rate.

* The following are the bedroom sizes needed to accommodate the present families if current BHA Tenant Selection and Assignment plan guidelines are applied. They provide that children of different sex over the age of 6 are not expected to share bedrooms, but two children of the same sex are expected to share a bedroom. One BR, 5%; 2BR, 35%; 3BR, 33%; 4BR, 18%; 5BR, 7%; 6BR, 2%. The 40 elderly households require predominantly one, but also some two BR units.

Due to the high density of certain areas of the present BHA public housing project, it has been assumed for some time that the developer will propose the demolition of some of the buildings as well as a reduction in height of others. Those remaining buildings will be extensively rehabilitated, both on the interior and the exterior, with the newly-constructed dwelling units being considerably larger than the present ones. Whatever new construction occurs should be primarily of a townhouse type and must be compatible with the existing walk-up buildings.

The intention of the parties is that the new housing community have a family-oriented character and that there be, as far as possible, a mixing of incomes and races throughout the development.

2. Management

At the time of final designation, and subject to adequate funding, the private developer will be expected to enter into a contract with the BHA to assume interim management of the Columbia Point Housing Project. It is the three parties' intention that private management improve the operation of this troubled project and upgrade the quality of life for the present tenants.

In addition, the private developer will be required to manage all the housing units in Phase II upon their completion and occupancy.

The developer must manage the project so as to maintain a sense of community among the residents. It is expected that management proposals will provide for strong participation by residents in development decision making as well as its operation after completion. This will include involving the Task Force, the elected body representing the existing tenants, in a partnership arrangement, providing a mechanism for insuring some residential control in management operations and providing financing of the residents' organization to assure its continued involvement in decision making at all stages. As part of its undertaking with the developer, the Task Force will create a plan providing for the representation of new Columbia Point residents as the development becomes occupied.

3. Site Planning - Recreation and Open Space

For some time it has been known that one of the keys to the success of the new residential community will be a new site plan which is as sensitive to the particular conditions at Columbia Point as the existing one is insensitive. Development proposals must therefore demonstrate an acute awareness of the need for:

-- less density in the residential areas
-- integration of the housing development with Bayside Exposition Center and other land uses on the peninsula
-- opening up waterviews from all parts of the site, from ground level and from the interior of buildings
-- provision of internal access to waterfront open space and recreation facilities
-- improved security and safety

In relation to open space, it is the intent of the redevelopment program that the waterfront public recreational area, accessible to all future residents of Columbia Point, be continued from Carson's Beach to the Kennedy Library, so that an easement for this use must be provided by the developer along the waterfront edge of the site. If the developer chooses to develop housing on the site of the present City outdoor recreational facilities, then he must provide new similar facilities elsewhere; if not, he must replace or renovate what is there now. Within the residential areas, open spaces in the forms of patios, backyards, playgrounds, tot-lots and sitting areas should also be provided.

4. Infrastructure

One of the assets of Columbia Point is that the infrastructure of public and private utilities and pedestrian and vehicular circulation systems are basically in place. However, there will need to be some improvements made to the existing access and circulation systems, to be funded, it is hoped, largely by UDAG funds through the BRA, but also in part by the developer.

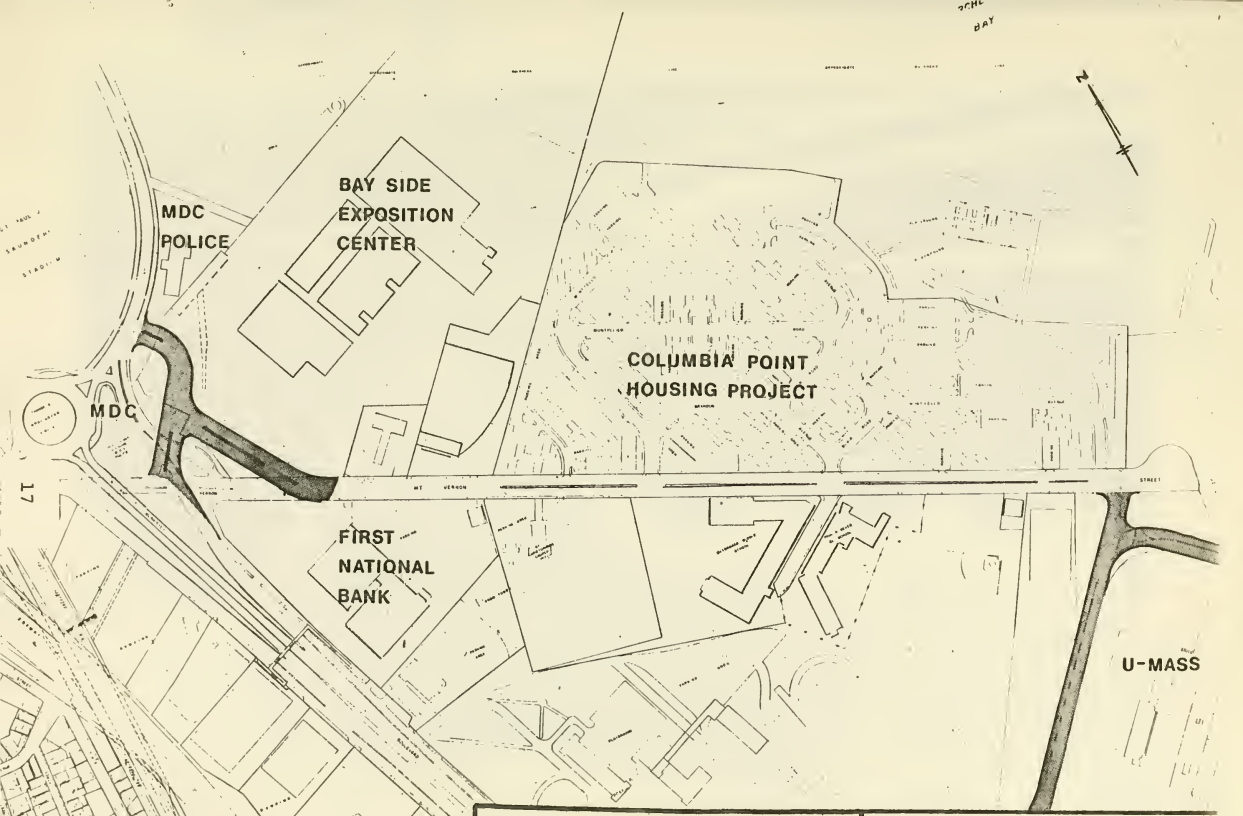
To allow for future development at Columbia Point, the Boston Sewer and Water Commission is currently constructing a 24 to 36 inch diameter separate sanitary interceptor in Mt. Vernon Street and a new transmission main to bring additional water to the area.

As part of its Columbia Point UDAG application, the City has requested $2.1 million of the $4.5 million in the Phase I allocation to pay for the engineering and construction of a new, more direct and attractive entrance from Day Boulevard to Mt. Vernon Street capable of handling higher traffic volumes and of providing a stronger connection to the outside community, and for a similar connection between the U.Mass loop road and Mt. Vernon Street at the other end of the development site (see Map 4). The application also requests $20.5 million for the Phase II development. It is anticipated that the developer may want to use a portion of these funds to upgrade circulation and public amenities on the interior of the peninsula. While the exact definition of these will have to await the selection of the private developer and his plans, it is expected that they might include the landscaping of Mt. Vernon Street, circulation improvements within the Phase II residential parcel, and upgraded vehicular and pedestrian access to the waterfront and to the Bayside retail area.

Development proposals should be responsive to the need for safe and efficient vehicular circulation and provide for safe and direct pedestrian access from all buildings to the waterfront, community facilities, Bayside Exposition Center, the proposed retail site, the MBTA stop and the open space system.

5. Affirmative Action in Hiring and Marketing

The parties believe that the redeveloped Columbia Point should be a racially-integrated community within each income group. The parties also believe that minority persons and public housing resi-



COLUMBIA POINT PENINSULA
REVITALIZATION PROGRAM

MAP NO. 4

PUBLIC IMPROVEMENTS

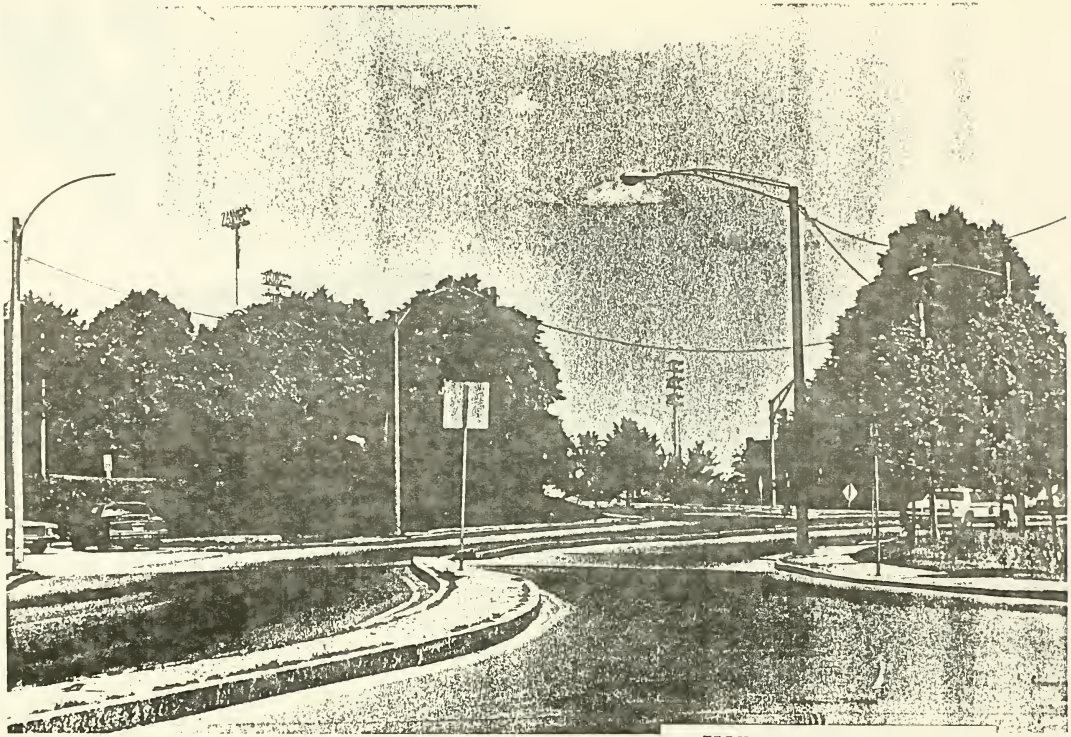


ILLUSTRATION 4.
PHASE I PUBLIC IMPROVEMENTS: PRESENT ENTRANCE FROM DAY BOULEVARD TO MT. VERNON STREET

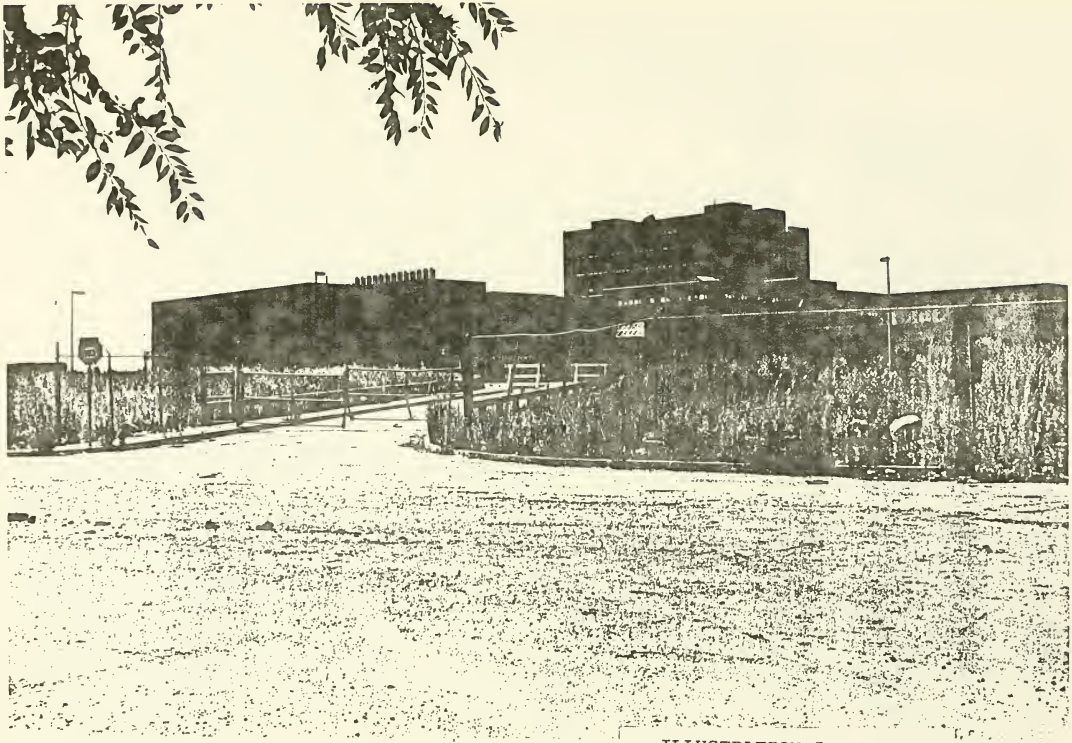


ILLUSTRATION 5.
PHASE I PUBLIC IMPROVEMENTS: PRESENT ENTRANCE FROM UMASS LOOP ROAD TO MT. VERNON STREET

dents must be afforded a fair-share of the construction job and permanent job opportunities created by the redevelopment process. As a requirement of all submissions, the developer will be expected to propose specific plans and programs for achieving racial integration and employing minority and public housing residents at Columbia Point (see Appendix B). In addition, once the developer has been selected, the Task Force will appoint its own affirmative action officer to assure the implementation of affirmative action requirements. It is the City's policy that the developer seek to provide 50% of the construction jobs for residents of Boston, 25% for minorities and 10% for women.

See Maps 5-10 for additional information on the existing Columbia Point Housing Project.



ILLUSTRATION 6.

COLUMBIA POINT HOUSING
PROJECT FROM WATER'S EDGE

COLUMBIA POINT HOUSING PROJECT

MAP 5

RESIDENTIAL BUILDING

COLUMBIA POINT HOUSING PROJECT

MAP 6

HEIGHT OF BUILDINGS

COLUMBIA POINT HOUSING PROJECT

MAP 7

CURRENT BUILDING USE

COLUMBIA POINT HOUSING PROJECT

MAP 8

CURRENT OCCUPANCY

COLUMBIA POINT HOUSING PROJECT

MAP 9

EXISTING UTILITIES
(Heating)

EXISTING UTILITIES

Heating System	Heating pipes
"	
"	
"	
Mothballed Structures	

COLUMBIA POINT HOUSING PROJECT

MAP 10

EXISTING UTILITIES
(Sewer and Water Lin

EXISTING UTILITIES

Utilities (sewers and water supply)

IV. PUBLIC FUNDING

It is the objective of the parties to have the development carried out, as far as possible, through private funding commitments. The status of public funding of the Phase II development is as follows:

1. The Boston Housing Authority has been awarded $10,000,000 in Urban Initiatives Funds for Columbia Point by the U.S. Department of Housing and Urban Development. Urban Initiatives funds are subject to statutory requirements which limit their use to eligible work items in a public housing site, such as construction, alteration, demolition or site work, and to State bidding requirements. The BHA is prepared to request waivers of non-statutory requirements to permit the most flexible possible use of these funds. HUD has indicated a willingness to allow maximum flexibility in the use of these funds for the redevelopment.

2. The City of Boston has applied for a $25 million UDAG grant for the Columbia Point Peninsula Revitalization Program. The application requests first phase funding of $4.5 million. Of this, $2.1 million would create new vehicular access from Day Boulevard to Mt. Vernon Street and from Mt. Vernon Street to the Kennedy Library and University of Massachusetts sites. In addition, $2.25 million would be provided as part of Bayside Associates' permanent financing for the renovation of Bayside Mall into the largest trade center in New England. The repayment of this loan would be directed exclusively to assist the overall financial feasibility of the Phase II residential uses. In Years 1-5, the developer will make interest-only payments on the loan, but starting in Year 6 and continuing through Year 20, will make principal and interest payments so that the $2.25 million is fully amortized at the end of the twenty-year loan term.

 The second phase of the UDAG grant would provide $20.5 million to help support the creation of the Phase II residential community. The specific uses of these UDAG funds will be determined following the final selection of a private developer for this phase of the Columbia Point Peninsula revitalization. In demonstrating to HUD the need for this financial assistance to the residential project, it was projected that $16 million of this amount be used to provide part of the permanent financing for the development of 400 moderate and 800 market-rate units. The balance might be used for public improvements, such as landscaping of Mt. Vernon Street and circulation improvements in the development parcel, including improved pedestrian and vehicular access to the waterfront, as well as waterfront improvements.

3. Beyond $100,000 currently budgeted in Community Development Block Grant funds and $400,000 contemplated as part of the City's Year VIII Community Development Block Grant application for preliminary engineering, no City funds are presently appropriated for this project. Proposals which provide necessary site improvements without recourse to City funds will be viewed as having a more realistic chance for success than those dependent for their feasibility upon the provision of such subsidies.

4. No funds have been committed by HUD for housing subsidies. Proposals which provide housing for low and moderate income families and individuals without recourse to public subsidy will be viewed more favorably than those which are dependent for their feasibility upon the provision of such subsidies.

5. The Boston Housing Authority's bond indebtedness for the Columbia Point project is currently $12.9 million. This offering contemplates the sale or lease of the BHA project to the private developer, the proceeds of which will go towards repaying the bonds. The price offered for purchase or lease will therefore be a consideration in the developer selection process.

V. DEVELOPER SELECTION PROCESS

A. Introduction

The process for selecting a developer will be competitive. It will be undertaken jointly by the two public bodies, the BHA and BRA, and the tenants' organization, the Task Force, and will be subject to HUD's concurrence. The final selection by the three parties will require formal designation by the BRA and BHA.

The developer selection process will be conducted in two stages. The first will consist of interested developers submitting their qualifications for the project and the reviewing parties choosing from these submissions a short-list of the three to 5 development teams most closely meeting the selection criteria which follow. The first stage selection process will be based on a point system which has been agreed to by the three parties. In the second stage of selection, the finalist teams will then be asked to participate in the preparation and submission of full development proposals for the site. Final selection will be made after careful and extensive review of the original proposals and additional requested material, after developer presentations and interviews, and after negotiations between the selecting parties and the developers.

This developer selection process will result in the tentative designation of a developer for Phase II of the Columbia Point Peninsula Revitalization Program. The BHA and BRA will offer tentative designation to the selected developer, and the developer must formally accept the designation and agree to abide by the terms and conditions of the designation. The developer must submit a $100,000 irrevocable letter of credit with its acceptance of the designation. The letter of credit may be called, upon the agreement of the BHA and BRA, if the designated developer, through its own fault, fails or is unable to carry out its responsibilities in the redevelopment of Columbia Point.

The selected developer and the Task Force is to enter into a partnership agreement defining each party's role in the development and management process. It is anticipated that this will occur subsequent to tentative designation.

Once the developer has formally accepted tentative designation, it will take the lead in securing the financial commitments and government approvals necessary to carry out at least the first construction stage of the development. The developer or development partnership will work directly with the BRA and BHA, and in consultation with the other institutions on the peninsula and neighborhood groups, to refine the development, financing, management, marketing, site, construction phasing and relocation plans necessary to carry out the redevelopment within an agreed upon schedule.

If the Task Force has not yet formed a partnership with the developer and thereby assumed decision making responsibilities, the Task Force will retain an approval role over the development plan similar to that of the BRA and BHA. The Task Force will retain such an approval role until it enters into a partnership agreement with the developer. Thus,

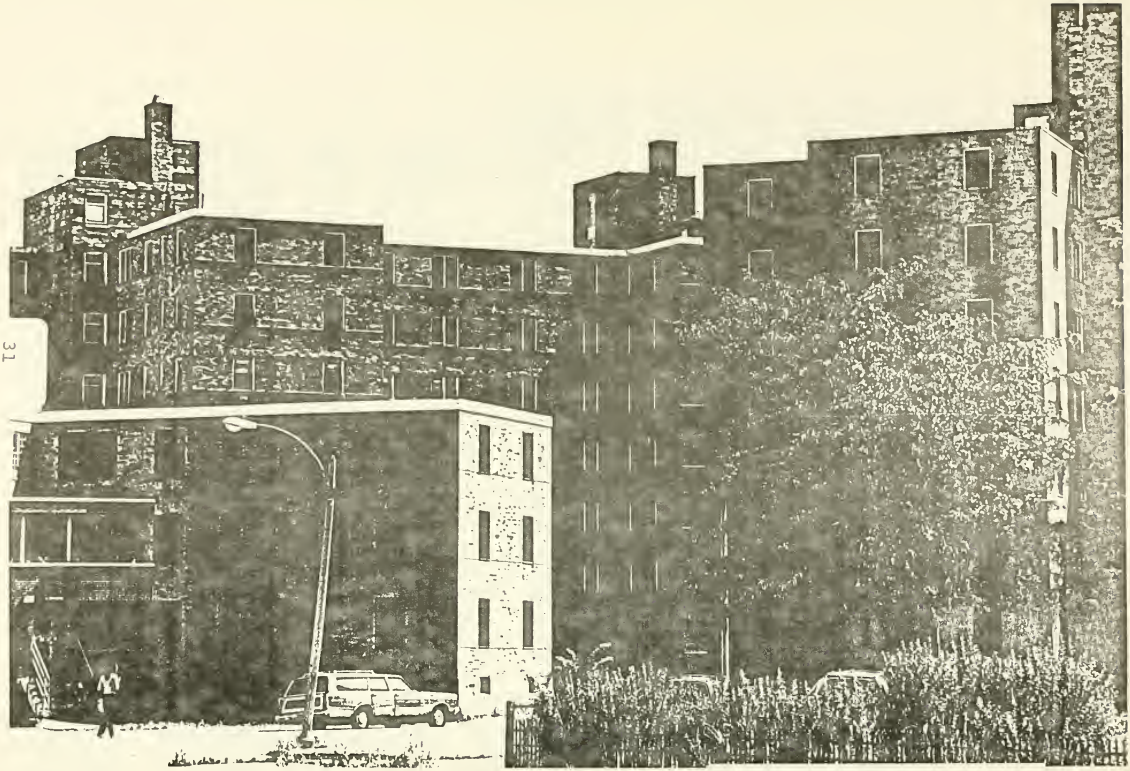


ILLUSTRATION 7.
WALK-UP BUILDING AND
BOARDED-UP MID-RISES,
COLUMBIA POINT HOUSING
PROJECT

whenever the Task Force has a developer role through the partnership agreement, it will cease to have an approval role. Whenever it retains an approval role, it will not also act as a developer.

Upon approval of the above development plans by the BHA, BRA, the Task Force and other public agencies, as necessary, and receipt of preliminary funding commitments and subsidies, final design of both public improvements and housing construction will be prepared. This will occur prior to beginning extensive and detailed work on the construction documents. A final site plan, floor plans, elevations, outline specifications, cost estimates, financial pro forma and detailed time schedule for completion of the initial construction stage will be prepared for review and approval by the BRA and BHA and the Task Force, as necessary.

When all necessary elements of the first construction stage of development have been secured by the developer and approved by the BRA, BHA, and the Task Force, as necessary, depending on the partnership role of the Task Force defined in the partnership agreement, and satisfactory progress has been made toward completing plans for subsequent development construction stages, the BHA and the BRA will grant final designation to the developer.

Immediately following final developer designation the BHA and, if appropriate, the BRA, will complete disposition agreements with the developer for land to be included in the first stage of the redevelopment. The disposition agreement(s) will contain the requirement that the developer assure the continuing presence of four hundred low-income units, as well as other requirements established in this offering.

It is the goal of the parties to choose the development team best able to:

1. Achieve the physical development objectives outlined in Section III, above, namely the construction of 1200-1600 units of new and rehabilitated housing units, related community facilities, streets, open spaces and recreational areas.

2. Achieve the social development objectives outlined in Section III, above, namely an economically and racially mixed community integrated into the life of the City of Boston.

3. Achieve the financial objectives stated in Section IV, above, namely a willingness and ability to carry out and maintain the development with minimal reliance on public funding or subsidies and to offer a purchase or lease price for the project property that will enable the BHA to repay as much of the outstanding indebtedness on the Columbia Point project as possible, consistent with the highest quality development.

4. Achieve the management objectives stated in Section III, above, namely the immediate improvement of the public housing project and the assumption of permanent management responsibility for all the housing units and the involvement of residents, represented by the Task Force, in decision-making about the development and in on-going operations of the project.

5. Achieve the affirmative action objectives stated in Section III, above, and in Appendix B, namely to take affirmative action in hiring minority persons and public housing residents for construction and permanent jobs and to attain racial integration goals in residential occupancy of the housing units.

6. Assure fully adequate capital and operating funds for at least 400 units of low-income (public housing eligible) housing throughout the life of the development.

The rest of this section of the offering lays out, in detail, the submission requirements in both the first and second stages of selection so that developers may determine the extent of involvement that will be required. In addition, the full schedule for submissions, review and selection is included and it is the intention of the parties to adhere to the schedule throughout the process.

B. Schedule for Developer Selection Process

September 12, 1982	Advertisement of Public Request for Developer Proposals.
November 1, 1982	First stage qualifications due from interested developers.
November 1 - December 1, 1982	Review of qualifications - selection of finalists.
December 1, 1982	Finalists notified - asked to proceed with second stage preparation of full development proposals.
February 22, 1983	Full development proposals due from finalist developers.
February 22-April 25, 1983	Review of proposals; presentations and interviews.
by April 25, 1983	Selection of preferred developer.
April 25, 1983 --	Negotiation, refinement of plan with tentatively selected developer, leading to Tentative Designation by BRA and BHA.

C. First Stage Developer Qualifications Submissions

1. General

a. Each development team must include the following components:

Development
Management
Construction Contracting
Architecture (including Landscape and Planning activities)
Engineering
Legal

5. Achieve the affirmative action objectives stated in Section III, above, and in Appendix B, namely to take affirmative action in hiring minority persons and public housing residents for construction and permanent jobs and to attain racial integration goals in residential occupancy of the housing units.

6. Assure fully adequate capital and operating funds for at least 400 units of low-income (public housing eligible) housing throughout the life of the development.

The rest of this section of the offering lays out, in detail, the submission requirements in both the first and second stages of selection so that developers may determine the extent of involvement that will be required. In addition, the full schedule for submissions, review and selection is included and it is the intention of the parties to adhere to the schedule throughout the process.

B. Schedule for Developer Selection Process

September 12, 1982	Advertisement of Public Request for Developer Proposals.
October 18, 1982	First stage qualifications due from interested developers.
October 18 - November 15, 1982	Review of qualifications - selection of finalists.
November 15, 1982	Finalists notified - asked to proceed with second stage preparation of full development proposals.
January 17, 1983	Full development proposals due from finalist developers.
January 17-March 7, 1983	Review of proposals; presentations and interviews; negotiations with developers.
by March 18, 1983	Selection of developers; tentative designation by BRA and BHA.

C. First Stage Developer Qualifications Submissions

1. General

a. Each development team must include the following components:

Development
Management
Construction Contracting
Architecture (including Landscape and Planning activities)
Engineering
Legal

Each developer submission shall be accompanied by a Letter of Interest listing the development team members (including a chief contact person), briefly summarizing the team's qualifications and past experience relevant to the proposed Phase II development, and indicating the team's willingness to prepare full development proposals, if selected as a finalist, and to proceed expeditiously with all aspects of the development if designated as the preferred developer.

The Letter of Interest should also describe the functional, corporate or other legal relationships among the members of the development team in carrying out the Phase II development.

b. In addition to submitting their qualifications for consideration in the first stage of selection, developers may include comments, questions, or requests for clarification regarding any aspect of Columbia Point, this Request for Developer Proposals, the selection process, etc.

c. Ten copies of all materials should be submitted to each of the following:

Robert J. Ryan, Director, Boston Redevelopment Authority, One City Hall Square, Boston, MA 02201

Lewis H. Spence, Receiver/Administrator, Boston Housing Authority, 52 Chauncy Street, Boston, MA 02111

Roger Taylor, President, Columbia Point Community Task Force, Inc., 320 Mt. Vernon Street, Dorchester, MA 02125

Materials must be received by 5:00 PM October 18, 1982.

d. A certified check of $3,000 drawn to the order of or assigned to the Boston Redevelopment Authority must be submitted along with the development team's qualification materials. The Authority is under no obligation to earn interest. Those applicants that are not successful in the first stage qualifying process will be refunded $2,500. Finalists asked to proceed with the second stage preparation will be refunded $1,000 if not selected as developer for the project.

2. Developer Qualifications

a. Submission Requirements

For the Development Component, the team shall submit:

(1) A statement of Previous Housing Development Experience showing all projects in which the principals of the proposed development entity have participated as general partners or equivalent. The statement should list all projects, showing their location, size, ownership type and development cost. It should also describe the construc-

tion and permanent financing arrangements for each project, showing the nature and extent of the participation of financial and lending institutions and of the developer. In particular, the developer's current equity interest in each project should be indicated. Where applicable, the statement should indicate what public program the project was developed under and what income level (low, moderate, market rate or mixed) it serves. It should also describe the type of development (high, mid or low-rise; apartments, townhouses, separate houses, etc.) and the architect, landscape architect and other consultants used on each project. The nature and extent of community and/or tenant participation in each development should also be disclosed. With respect to all projects listed, the statement must disclose and explain:

(a) Current financial default of more than 60 days duration.

(b) Mortgage assignment or workout arrangement

(c) Foreclosure

(d) Bankruptcy

(e) Litigation relating to financing or construction of the project which is pending or which was adjusted with a finding of liability against the developer.

(f) Real Estate Tax Delinquencies

(2) A personal Financial Disclosure statement for each person who serves as a principal in the proposed project. This statement shall be substantially equivalent to FHA Form 2417, attached as Exhibit C.

(3) A financial statement of the development entity prepared by a Certified Public Accountant. The statement should show assets, liabilities, and net worth of the firm, and should include information on all General Partners or principal shareholders.

All financial information will be held confidential.

b. Qualification Criteria

In order to be found qualified, developers must demonstrate:

(1) Successful completion of at least six projects of 200 units or more, or aggregate development of not less than 2,000 units.

(2) A successful track record on past projects with financial institutions and continuing strong working relationships with financial institutions.

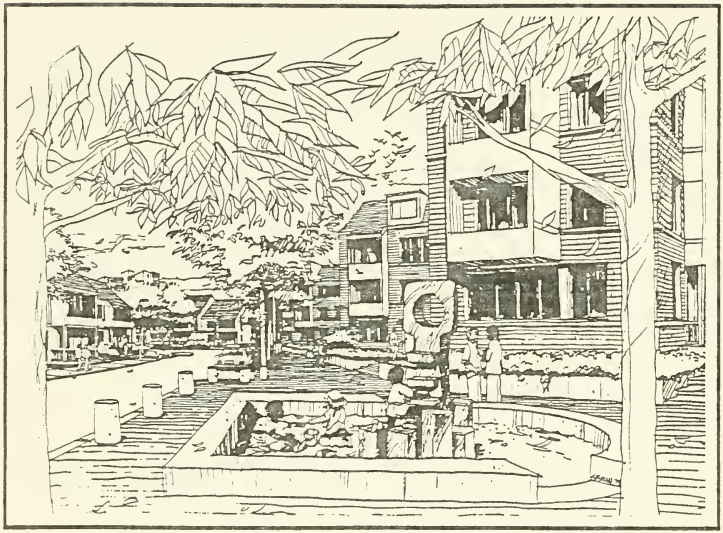


ILLUSTRATION 8.

RENDERING OF RENOVATED
WALK-UP BUILDINGS

(3) All projects are current, not more than 60 days overdue.

No more than 10% of the total units developed have been assigned, foreclosed or are under a workout arrangement.

Bankruptcy has not been declared by any developer entity or principal thereof associated with the Columbia Point Project.

In any litigation, the developer has not been found liable for financial irregularities relating to the project or for construction defects totalling more than 5% of the total development cost of the project.

(4) Net worth of the developer entity and/or the principals is at least $1,000,000.

(5) At least one successful experience which significantly involved resident organizations in the planning and carrying out of development activities.

3. Management Qualifications

a. Submission Requirements

For the Management Component, the team shall submit:

(1) A statement listing all properties under management now or in the last three years including name, owner, location, type of site, type of construction, income and subsidy mix, number and size of units, financing, mortgage status, success in achieving and sustaining goals of affirmative marketing plans. If any management contract has been terminated, show when and explain the reasons for termination.

(2) A statement listing any litigation pending or adjudicated with a finding of liability against the management entity in the previous five years relating to financial aspects of management, alleged discrimination in hiring, tenant selection or tenant relationships, or otherwise bearing upon the entity's effectiveness as a manager.

(3) A statement disclosing and explaining the kind of matters listed in paragraph 2a(1)(a) through 2a(1)(f) above, if different from matters disclosed therein.

(4) A list of all Certified Housing Managers employed by the entity and their current assignments.

(5) A copy of the current personnel policy, including affirmative action hiring plan.

(6) Examples of at least two Management Plans for previous developments located in urban settings, one a mixed-income and one a market-rate development.

b. Qualification Criteria

In order to be found qualified, managers must demonstrate:

(1) Successful management of at least six projects of 300 units or more, and an ability to manage not less than a total of 2000 units concurrently.

(2) The same factors listed in 2b(2), (3) and (4), above with regard to the management entity.

No judicial findings of liability relating to financial irregularities or discrimination and no history of frequent exacerbated landlord/tenant relationships.

(3) Successful implementation and maintenance of affirmative marketing efforts.

(4) Ability to manage mixed-income and market-rate projects.

(5) A history of equal opportunity in employment and of employment of certified housing managers.

4. Contractor - Submission Requirements

(1) A statement of bonding capacity.

(2) A list and brief description of previous completed developments of the complexity and magnitude of Columbia Point, and letters of reference from clients for those projects with regard to contractor's ability to complete the project on a timely basis and within budget.

(3) A description of affirmative action measures taken by the contractor on previous projects to train and employ minority workers and to utilize minority construction contractors; a description of the results achieved by such measures, including a list of minority construction firms used in past construction work, and any proposed joint venture or subcontracting relationships with minority firms being considered for Columbia Point development, and in addition, a description of any negotiations or special arrangement with unions made in an effort to achieve affirmative action measures.

(4) Statement as to pending or previous litigation in which the contractor was alleged or found to be liable for construction deficiencies. Statement as to debarments, suspensions or temporary denials of participation for construction defects not satisfactorily corrected.

5. a. Architect - Submission Requirements

(1) GSA Forms 254 and 255, attached as Appendix D, updated to reflect all significant current and past activities of the firm relevant to the Columbia Point development.

(2) A sample of renderings, schematics and development programs from other family housing developments, a recreational or community use facility, and a commercial facility for which the architect provided design and construction administrative services.

(3) A description of previous experience with the rehabilitation of existing residential buildings and with new construction, and work with tenant groups in establishing space programs, phasing plans and design.

(4) Statement as to pending or previous litigation finding or alleging liability for design deficiencies.

b. Landscape Architect - Submission Requirements

(1) GSA Forms 254 and 255, updated to reflect all significant current and past activities of the firm relevant to the Columbia Point development.

(2) A sampling of site plans, schematics, renderings, or photos of landscape work done which is relevant to the proposed work at Columbia Point, including particularly any previous experience with waterfront areas in terms of design and choice of suitable materials.

c. Community Planner - Submission Requirements

(1) A description of previous experience in the development of integrated, mixed-income, mixed-use communities; in projects in which extensive management, social and economic programs have been combined with major physical construction; and in working with tenants and other community groups.

6. Other Team Member Qualifications

a. Engineer - Submission Requirements

(1) A list of previous experience on projects of the magnitude of Columbia Point, identifying particularly:

- o experience with building on soil conditions similar to those at Columbia Point, i.e., largely fill;
- o experience with design and construction of waterfront and water-related improvements;

- o experience with utilities and circulation;
- o experience with total and partial demolition of masonry buildings.

b. Lawyer - Submission Requirements

(1) A description of previous experience with housing or mixed-use developments; with tenants and other community groups; with complex private/public relationships; with condominium and cooperative forms of ownership; with public programs and funding; and with syndication.

2. All Team Members - Submission Requirements

a. A description of all other developments pending or under construction and not previously listed in which a member of the proposed development team has major responsibility, and a description of the team member's responsibility.

b. A description of past minority utilization practices, indicating the proportion of minority persons working in professional, paraprofessional, management, and clerical positions and a description of recruitment and training efforts currently being utilized.

D. Second Stage Development Proposals

This section describes the submission requirements for the finalists.

Developers may (but are not required to) submit more than one alternative for any or all of the components of the redevelopment plan (e.g. overall strategy, staging, financing, design, etc.). Each alternative, however, must include the level of specificity and detail outlined below. The three parties do not want a mere "laundry list" of alternative approaches.

The BRA, BHA and Task Force will consider the second stage proposal to be flexible and open to modification over time as the result of further discussions with the selected developer.

The negotiation and refinement of proposals will take place only after the BHA, BRA, and Task Force have tentatively selected a preferred developer. If satisfactory agreements and other refinements can be made with that developer, the BRA and BHA will proceed to tentatively designate that developer. If not, the parties will invite another developer to negotiate, or consider other alternatives.

During the second stage, developers shall submit development proposals that contain the following elements;

1. Overall Development Program and Strategy

A narrative description of the developer's proposal, supplemented by graphic presentations, where appropriate, addressing the following points:

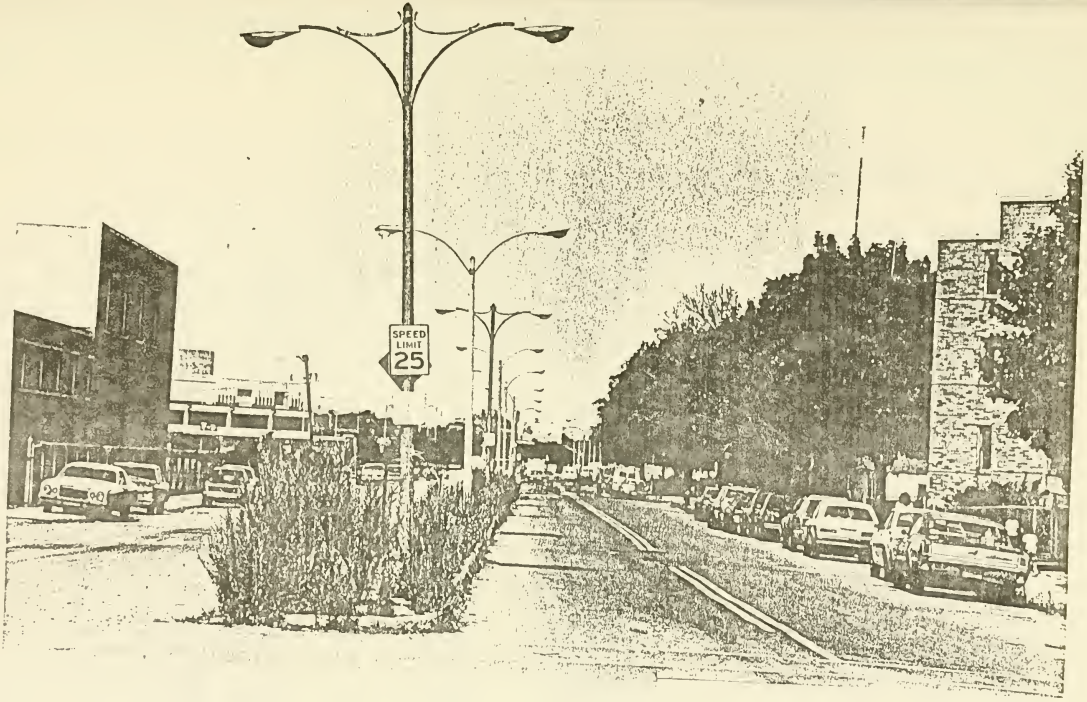


ILLUSTRATION 9.

PHASE II PUBLIC IMPROVE-
MENTS: MT. VERNON STREET

a. number, size, ownership type, family orientation and resident income and age distribution, of proposed housing units;

b. which existing public housing buildings the developer plans to retain, how those retained will be used, and which buildings he plans to demolish partially or totally;

c. the proposed relationship between the developer and the Task Force, addressing the Task Force role in development, management, marketing and affirmative action, and how the developer plans to provide financial support for the Task Force;

d. commercial and other non-housing components of the proposed development, defining clearly which components the developer plans to develop;

e. how the developer plans to achieve affirmative action objectives in hiring, integration and marketing;

f. how the developer would generally propose modifying the existing utility, vehicular, pedestrian, open space and recreational facilities to support the residential development, and how he would specifically allocate design, engineering, construction, funding, and management responsibilities for each of these elements between himself, other private entities, and identified public agencies.

2. Staging of Development

a. A general description of the staging plan for the development throughout the planning and construction periods.

Each stage should identify:

(1) parcel(s) to be used and/or specific areas of the parcel(s);

(2) amount and location of demolition;

(3) general number, size, ownership type, income and age distribution, family type, rehabilitated or new, and location, of housing units to be provided in that stage;

(4) public and private utility, circulation, recreational, community commercial, and other non-housing improvements;

(5) management improvements and initiation of private housing management services; and

(6) actions to be taken under the marketing plan.

The staging plan shall describe:

(1) in general terms how and where current Columbia Point residents will be relocated;

(2) generally the number of moves required prior to assignment to a permanent new or renovated unit;

(3) whether any interim rehabilitation for relocation will be required.

b. A tentative proposed schedule for the development which:

(1) places the stages defined above in a specific time frame;

(2) identifies when the Phase II site must come under the developer's control;

(3) when necessary public approvals and development permits must be initiated and obtained.

3. Costs and Financing

It is requested that the required financial information be submitted in a format to be provided to the development teams. (This will include development and operating pro forma and a form for the presentation of the financing package.) These forms may be supplemented where necessary with text and additional financial information. Since it is recognized that some of the financial resources reflected in these plans will not be committed at the time of submission, the parties also request that an analysis and evaluation of the achievability of the financing package be included in this section.

a. A preliminary cost estimate for all aspects of the development, including the basis for each (comparables or actual estimates for this proposed development) including:

(1) an "order of magnitude" cost estimate for the entire project;

(2) estimated land cost;

(3) estimated per unit construction costs for the new and rehabilitated housing respectively;

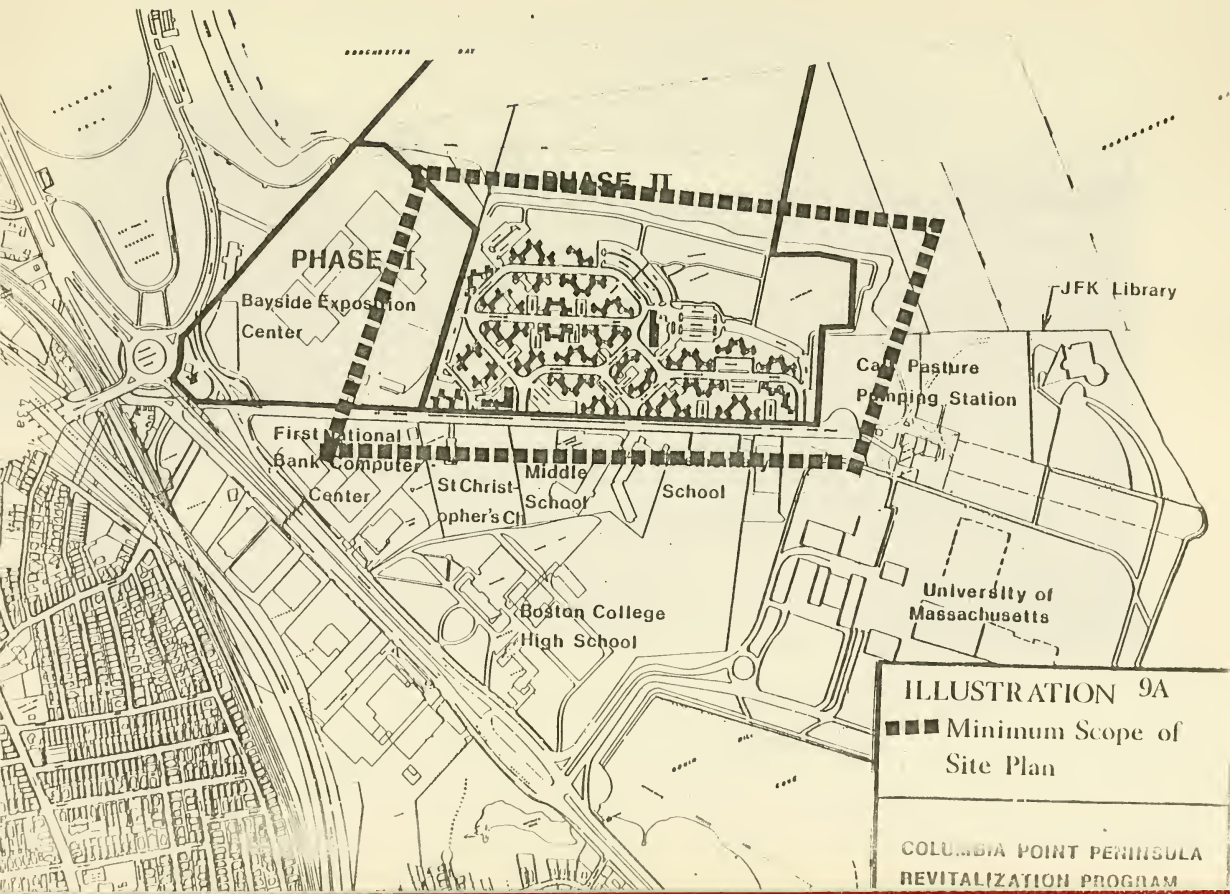
(4) estimated per unit operating costs;

(5) estimated p.s.f. costs for each of the proposed non-housing components and infrastructure facilities proposed to be developed either by the developer or by other entities or agencies.

b. A preliminary financing package describing:

(1) what funds the developer and other members of the development team will commit;

(2) what other private and public funds will be sought and from what sources;


PHASE II
PHASE I
Bayside Exposition Center
JFK Library
Pasture
Pumping Station
First National Bank Computer Center
St Christopher's Ch
Middle School
School
Boston College High School
University of Massachusetts
ILLUSTRATION 9A
Minimum Scope of Site Plan
COLUMBIA POINT PENINSULA
REVITALIZATION PROGRAM

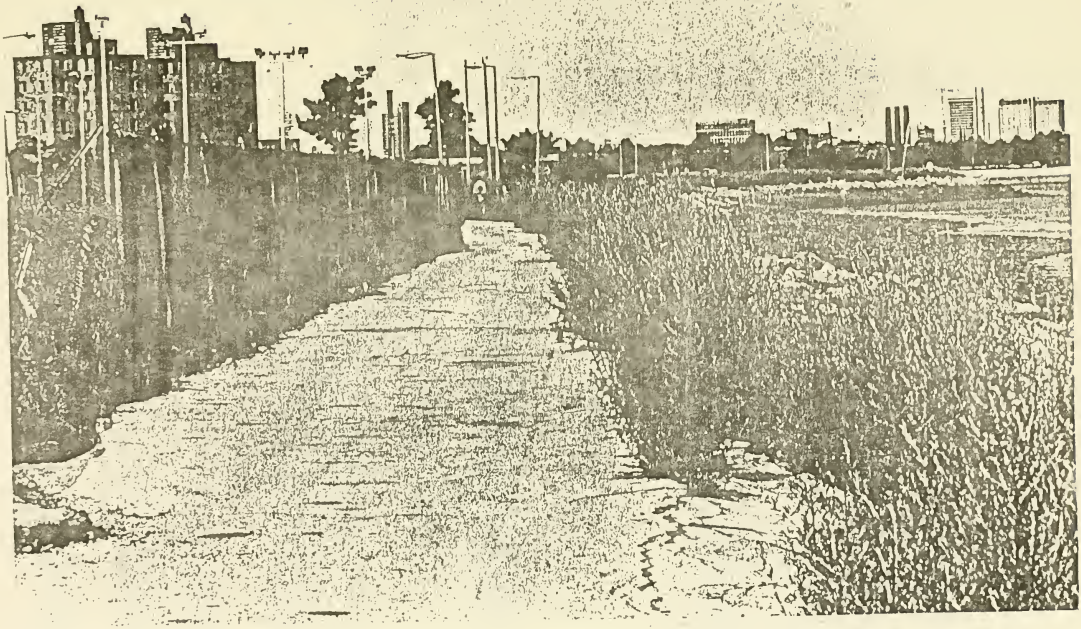


ILLUSTRATION 10.
RELATIONSHIP OF COLUMBIA
POINT HOUSING PROJECT
TO THE WATER

(3) when these funds might be available;

(4) how the low, moderate, and market units respectively are proposed to be financed;

(a) specifically, how the Urban Initiatives and the proposed UDAG subsidy would be used

(5) the proposed ownership mix of the development (rental, cooperative, condominium, etc.), and what income groups each ownership form would serve.

c. Demonstration of the financial feasibility of the proposed development

(1) sufficient factual information in support of its demonstration of feasibility shall be provided to allow the reviewers to judge what degree of confidence is warranted that the necessary elements of the financing package will be available.

4. Design Submissions

The developer shall submit the following:

a. Preliminary Plans

(1) Entire proposed development site (BHA and City park parcels, plus edges of surrounding parcels to show context) as shown on attached map (Illustration 9A) at 1"=40'.

(2) The site plan should indicate clearly:

(a) building types
(b) number of units proposed in each building
(c) housing locations and density
(d) extent of demolition and rehabilitation
(e) relation of proposed housing to open spaces, recreational facilities, pedestrian and vehicular circulation, and parking
(f) landscape design and material

b. A working or study model of the proposed development site (as defined above) at 1"=40'.

c. Preliminary Schematic Designs for the reuse of an existing mid-rise building (Building 17) and for a new or renovated low-rise building or cluster of townhouses.

(1) Site plan showing relationship of the building(s) to open space, parking, pedestrian and vehicular circulation systems, and orientation to the water.

(2) Schematic designs of the ground floor (and environs) and typical upper floor(s) at 1/8"=1'.

(3) Waterside and opposite side elevations at 1/8"=1'.

(4) Representative sections of these buildings.

(5) A narrative description of the major design elements of the reuse and new building programs.

(6) A preliminary cost analysis on both a unit and building basis.

The proposal shall also demonstrate, either graphically or through narrative, how the proposed design responds specifically to the three parties' concerns regarding:

- o integration of the housing development into a cohesive, mixed- income community;
- o internal access by the community to waterfront open space and recreational facilities, separated from general public access to the waterfront;
- o integration of the Phase II housing development with other land uses on the Peninsula and with the rest of the City;
- o suitability of the proposed design for a family development; and
- o how the proposed design contributes to the security of housing residents.

5. Specialized Sub-Plans

The developer shall submit sub-plans discussing its proposed approach to three areas of concern: housing management, affirmative marketing and integration, and affirmative action in hiring. This subsection outlines the required contents of each subplan.

a. Housing Management

(1) An interim management plan for existing public housing covering the period before current residents are permanently rehoused in new and renovated units.

The plan shall:

(a) identify those management functions for which the private developer is prepared to take responsibility, either directly or under contract to appropriate public agencies;

(b) identify the point in the planning and redevelopment process at which the developer would enter into a contract with the BHA for interim management;

(c) provide an analysis of BHA standard private management agreement and recommended changes;

(d) include:

(1) an estimate of per unit cost for private management;
(2) a proposed management budget including salary scales;
(3) routine and preventive maintenance schedules;
(4) a security plan.

(2) A preliminary permanent management plan for all new and renovated housing, related community facilities and those recreation facilities that generate income.

The plan shall:

(a) identify those management functions for which the private developer is prepared to take responsibility, either directly or under contract with appropriate public agencies;

(b) include:

(1) management staffing (reflecting affirmative action and tenant hiring goals and training programs as described more fully in the Affirmative Action subplan required below)
(2) tenant selection
(3) assignment and eviction criteria
(4) tenant grievance procedures
(5) general maintenance, repair, preventive maintenance and inspection programs including a plan for a periodic inspection of major operating systems and a plan for reporting, logging and completion of repair orders
(6) a security plan including staffing
(7) a financial plan that includes a proposed management budget and indicates the proportion of rental income earmarked for management services
(8) an approach to private management of public facilities such as streets, lighting, parks, bus shelters, and community facilities.

(c) describe how management, tenant assignment, and security operations will be experienced (after the new management takes over and after renovation is completed) by low, moderate and high-income families in one of the typical existing 36-unit buildings.

b. Affirmative Marketing and Integration

A preliminary affirmative marketing and integration subplan which demonstates specifically how the developer would achieve and maintain in all phases of the development racial integration and the required income mix.

The plan shall include:

(1) the developer's overall strategy for changing the public image of Columbia Point

(2) a timetable

(3) a description of staffing and budget

(4) a definition of the roles of all involved parties, public and private.

c. Affirmative Action in Hiring

1. A preliminary affirmative action plan for the training and employment of public housing residents in construction at Columbia Point with first preference to Columbia Point residents.

The plan shall include:

(a) estimates of construction workforce and apprentice needs by trade for each year of the construction period

(b) numbers of public housing resident laborer and apprentice positions by craft and year of construction

(c) projections of future work of the private developer to which residents can be assigned for training

(d) provision of pre-training, high school equivalency work and additional support services to facilitate resident employment

(e) a description of any negotiations or special arrangements with unions deemed necessary to accomplish affirmative action measures.

2. Preliminary affirmative action plans covering employment and procurement for:

(a) construction management

(b) design and other professional services

(c) housing management including interim management

(d) business development

(e) social service and recreational programs

These plans will include provision for recruitment, hiring, training, and advancement of minorities and low-income Columbia Point residents. Training shall develop technical and management skills. Work opportunities shall be provided in integrated working situations involving existing employees, and shall lead to permanent job status and to promotion within the particular company and field.

Employment goals for minority persons and public housing tenants will depend upon the availability and skills of such persons and upon projections of job openings. The Task Force will inventory the availability and skills of all Columbia Point public housing residents and provide this information to all developer applicants. Realistic projections should be made of employee turnover and job creation. Employment goals shall be specified by number of minority persons and public housing tenants, types of jobs, timetable, and amount of training required.

APPENDIX A

COLUMBIA POINT RESIDENT REHOUSING AGREEMENT

The Columbia Point Community Task Force, Inc. (Task Force), the elected representative of Columbia Point residents, the Boston Housing Authority (BHA), and the Boston Redevelopment Authority (BRA) are working together to realize the revitalization and redevelopment of Columbia Point. An essential part of that redevelopment is to ensure that all current residents who wish to do so can continue to live at Columbia Point in a new or renovated unit, and that such units shall be comparable to and uniformly mixed with units for other income groups.

1. ACTIONS TO BE TAKEN BY THE TASK FORCE, BRA, AND BHA

The Task Force, BRA and BHA agree to take all necessary and appropriate actions to ensure that current residents (as used herein, the term "residents" shall mean all residents of Columbia Point who comply with the conditions set forth below) will have the opportunity to remain at Columbia Point. These actions shall specifically include, but not be limited to, the following. The BHA agrees not to spend the $10 million earmarked for Columbia Point under the Urban Initiatives program on any housing plan, or to sell or lease for redevelopment any of its property at Columbia Point, unless all residents are guaranteed the opportunity to live in new or renovated units at Columbia Point. The Task Force agrees not to approve any housing development program that fails to assure that current residents will be offered new or renovated units at Columbia Point. The Task Force agrees that in its capacity as a co-developer it will provide a guarantee that all residents will be offered a new or renovated unit at Columbia Point. The BRA agrees not to

propose, approve or adopt any urban renewal plan under M.G.L. c. 121B, any c. 121A agreement, any land disposition agreement, or any other plan for the residential housing redevelopment of Columbia Point, unless such urban renewal plan, 121A agreement, other plan or land disposition agreement contains a guarantee that all residents at Columbia Point will be offered new or renovated housing at Columbia Point.

2. CONDITIONS OF THE GUARANTEE

The guarantee of rehousing will be subject to the following conditions and restrictions.

a. The guarantee will cover residents who, as of the date of this agreement, are recognized by the BHA as lease holders at Columbia Point or heads of currently doubled-up households who are scheduled by the BHA to move into their own units at Columbia Point.

Immediately after execution of this agreement, a list of the residents to whom the guarantee will apply will be compiled by the three parties. To verify the accuracy of this list, all residents on it will be notified that they are entitled to a guarantee and will be required to acknowledge receipt of the notice. Residents not listed who can establish their right to a guarantee will be added to the final list of residents entitled to a guarantee. After verification by the BHA, this list will constitute the list of certified residents eligible for the guarantee.

b. A resident will not receive a guarantee, or the guarantee will be void, if a resident moves from Columbia

Point, unless the BHA, BRA or the codevelopers relocate her/him because of the redevelopment or because there is no decent, safe, or sanitary apartment available for her/him at Columbia Point. Any resident relocated temporarily or permanently during the redevelopment process shall be entitled to relocation benefits under applicable law, including the Federal Uniform Relocation Act, 42 U.S.C. 4601, or the state relocation act, M.G.L. c. 79A, if applicable or to such other benefits as may be agreed to among the parties and approved by HUD.

c. The resident must abide by the provisions of her/his current BHA lease or future BHA lease agreements.

d. The unit the resident will be offered will be appropriate to the household income (rents shall not exceed 25% of gross income or other applicable HUD guidelines for public housing rents if the household income falls within public housing eligibility guidelines, or guidelines for other subsidized housing rents if the household income falls outside of public housing guidelines but within such subsidized housing guidelines) and other eligibility qualifications such as household size or age.

e. If the resident household's income exceeds eligibility for subsidized housing before the household has been offered an appropriate new or renovated unit at Columbia Point, the guarantee shall remain in effect (i.e., the household will be offered a unit appropriate to its income and other eligibility qualifications). If the resident household's income exceeds eligibility for subsidized housing after the household has

moved to an appropriate unit, the household shall not be subject to eviction proceedings because of income. If the household is required by law to move from its unit, however, the household shall have priority for residency in market rent units on the Columbia Point peninsula.

f. In case of death, divorce, separation or other long-term absence of the individual leaseholder(s), the guarantee may be transferred upon notification to the BHA to an otherwise eligible adult who has been recorded in BHA records as a bona fide Columbia Point household member.

g. The guarantee will not be transferable to any other resident or non-resident nor to any relative except as above.

h. A household's guarantee will continue in effect until that household has been offered an appropriate new or renovated unit at Columbia Point.

i. All disputes concerning the rights of specific residents under the guarantee will be resolved pursuant to the BHA grievance procedure.

j. No special conditions of eligibility other than those specified herein shall be established, by lease or otherwise, as a condition for maintaining the guarantee.

3. CONDITIONS OF CONTINUED RESIDENCY

The Task Force, BHA and BRA and their successors in interest shall not discriminate against holders of the guarantee in the terms, conditions or privileges of rental or sale of, or in the provision of services or facilities in connection with, new or renovated units at Columbia Point. This provision

shall be included in any urban renewal plan under c. 121B, c. 121A agreement, and/or other redevelopment plan for Columbia Point and in any document executed by the BHA or BRA disposing of or leasing real property for residential use at Columbia Point.

4. REPRESENTATIONS, ENFORCEABILITY, ETC.

The BRA represents that this agreement has been reviewed and approved by the Mayor of the City of Boston. The Task Force, BRA and BHA represent that the representatives named below have been duly authorized to sign this agreement in behalf of the respective parties and to bind them and their successors in interest. The Task Force, BRA and BHA further agree that this agreement shall be legally enforceable by any of the parties hereto or their successors in interest, and by residents of Columbia Point.

5. TERMINATION

This agreement shall be terminated only in accordance with the provisions of this section. If any one of the parties wishes to terminate this agreement, that party shall so state in writing to each of the other parties. The parties may thereupon agree in writing to terminate this agreement. If all parties do not agree to terminate, the parties shall settle the disagreement by arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Associati The agreement shall be terminated only if the arbitration panel concludes in writing, after reasonable investigation, that the development objectives established by the Columbia Point Peninsula Redevelopment Agreement cannot be carried out by the three parties

In this event the parties agree that any new or renovated housing developed on the peninsula by or through the approval of any of the three parties shall provide appropriate units for Columbia Point residents.

The parties acknowledge that the lists of current residents who are leaseholders (see Enclosure #1) or heads of currently doubled-up households (see Enclosure #2), and who are to be entitled to a new or renovated unit after the redevelopment of Columbia Point are incorporated by reference into this agreement and said lists will be further verified as provided by the notice provision of Section 2(a) o the Agreement.

BOSTON HOUSING AUTHORITY

BY _____
Lewis H. Spence
Receiver/Administrator

BOSTON REDEVELOPMENT AUTHORITY

BY _____
Robert J. Ryan, Director

COLUMBIA POINT COMMUNITY TASK FORCE INC.

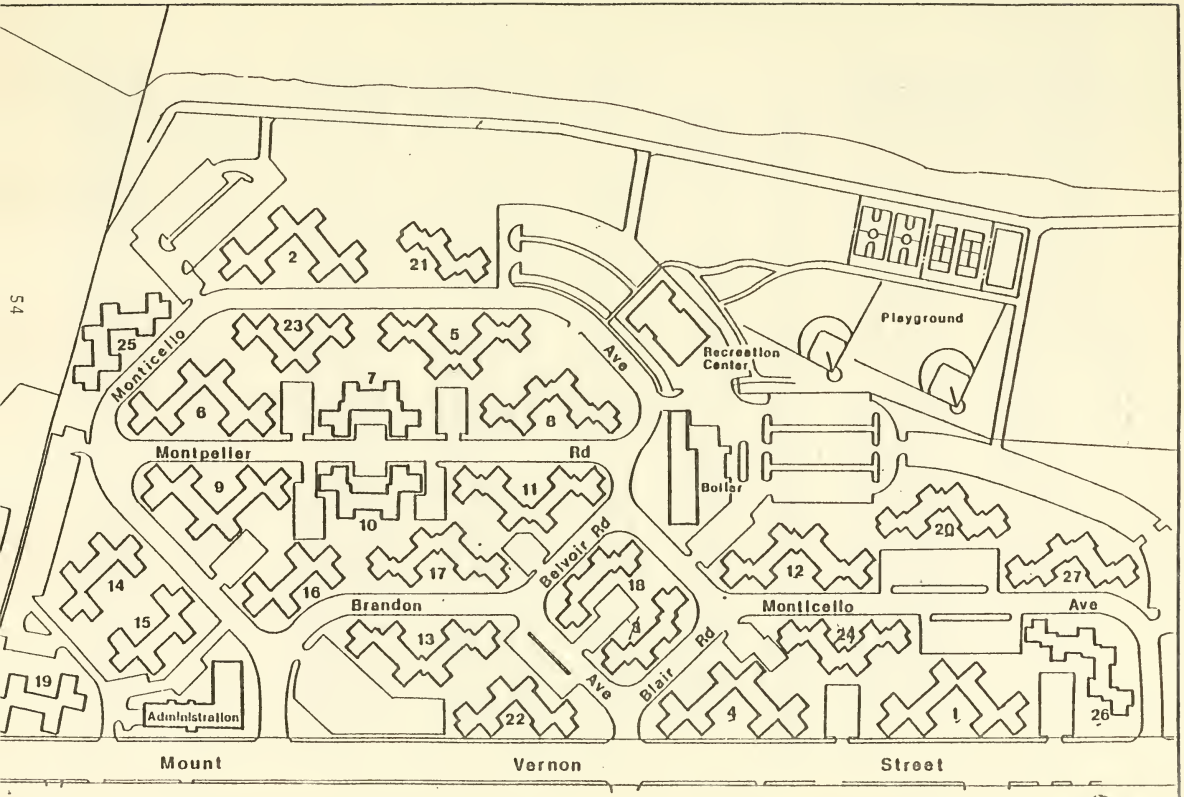
BY _____
Terry Mair, President

Apr. 18, 1981
Date

The Department of Housing and Urban Development (HUD) recognizes and endorses the objectives of this agreement. HUD hereby agrees to cooperate with the Task Force, the BHA, and the BRA, in ensuring that current residents of Columbia Point will have the opportunity to remain permanently at Columbia Point as set forth above.

U.S. Department of Housing and Urban Development

By: _____
James DiPrete, Jr., Regional Administrator
9/3/82



BUILDING NUMBERS PLAN

APPENDIX B

AFFIRMATIVE ACTION OBJECTIVES

The BRA, BHA and Task Force have adopted the following goals with respect to residential occupancy and construction hiring:

A. Residential Occupancy

In meeting the submission requirements, preparing the partnership agreement between the developer and Task Force and completing the development plan for final developer designation, a plan for meeting specific racial integration goals must be developed by the developer and approved by the BHA and BRA. The percentage goals as envisioned by the Three Parties are:

1. Although initially the low income units will house the predominantly minority present residents, over the long term the parties hope that at least 25% of units will be occupied by non-minority persons.

2. Not less than 30% of the moderate and market rate units shall be occupied by minority families or such higher percentage that is commensurate with the minority proportion in the City of Boston population.

The plan for meeting these goals shall address marketing strategies, orientation sessions for present and new tenants, tenant selection procedures with existing tenant involvement, and design and staging provisions which support full integration of the development.

Developer applicants shall be responsible for affirmatively marketing the units to reach the above goals. These efforts shall commence immediately after final designation and shall continue through both initial rent-up and for a sufficient period of time after initial rent-up to insure that integration is maintained. The final marketing plan shall specify those efforts to be undertaken by the developer and shall identify the applicable time periods.

Preliminary and final marketing plans shall include means of assuring potential residents that the redeveloped Columbia Point will be established and maintained as an integrated community. The final marketing plan shall also include provision for review and specific enforcement of racial integration goals by the BHA, BRA, and other appropriate public agencies.

B. Construction Hiring

The following standard affirmative action requirements of BHA and BRA in construction hiring and contracting should be met:

Construction Workers - Of the total person hours in each construction trade for a specified time period, it is BHA policy that there shall be 30% minority employee person hours. In addition, for City of Boston and BRA funded work, best efforts shall be used to attain at least 50% bona fide Boston resident person hours and 10% women person hours.

Contracting - It is BHA policy for an impacted area such as Columbia Point that 30% of final construction agreement price shall be expended for work performed or goods or services supplied by minority business enterprises (with two-thirds of this requirement to be satisfied by use of minority-owned construction contractors, as opposed to suppliers).

In addition to these standard requirements, the developer in cooperation with its contractors and appropriate unions shall develop opportunities for training and hiring of public housing residents with first preference to Columbia Point residents. The purpose shall be to aid in meeting minority affirmative action requirements and to meet the requirements of Section 3 of the Housing and Urban Development Action of 1968.

Two areas have been identified by the Three Parties: (1) the hiring of laborers and (2) the training for the different construction trades used at the Columbia Point construction site. After study of the construction size and phasing, developer applicants shall set forth realistic goals and timetables (and an explanation of how they were developed) for the hiring of public housing residents in both these categories over the term of the construction.

The BHA is currently developing, as part of redevelopment at Commonwealth, West Broadway and Franklin Field, programs for up to 16 apprenticeship positions and 10 labor positions in each development. The Columbia Point development presents much greater opportunity for training and laborer positions, because of the larger size of the proposed construction.

The developer applicant shall investigate this area and propose as a part of its initial submission a construction training program, sufficient to qualify for approval by the Massachusetts Bureau of Apprenticeship Training, to train and employ a specific number of public housing residents as apprentices in the construction trades. The training program must be finalized as a condition of final designation. As part of this requirement, the training program shall provide, to the maximum extent feasible, for employment of the apprentice participants on the Columbia Point construction site, other BHA public housing construction sites, and other construction sites under the control of the private developer who has been selected for Columbia Point. The training program shall also ensure that apprentices will be employed for sufficient time to complete the full apprenticeship requirements and receive journeyman status in their respective trades.

APPENDIX D

TENTATIVE DESIGNATION
OF
REDEVELOPMENT

MEMORANDUM OCTOBER 13, 1983

TO: BOSTON REDEVELOPMENT AUTHORITY

FROM: ROBERT J. RYAN, DIRECTOR

SUBJECT: COLUMBIA POINT TENTATIVE DESIGNATION OF REDEVELOPMENT FOR CITY OF BOSTON AND BOSTON HOUSING AUTHORITY PARCELS AT COLUMBIA POINT

On August 26, 1982, the Boston Redevelopment Authority (BRA) approved the issuance of a joint Request for Developer Proposals for the redevelopment of Columbia Point with the Boston Housing Authority (BHA) and the Columbia Point Community Task Force (CPCTF) (the "public parties"). Issued on September 12, 1982, it called for proposals to redevelop a fifty acre site consisting of City of Boston and BHA land (the "Development Site").

The Request for Developer Proposals required that proposals submitted provide for mixed income housing, where a minimum of 400 units be guaranteed as low income housing available first to present Columbia Point residents, where another 400 or so units be available as moderate income housing, and where the balance may be market rate units. Developers were also required to improve the Development Site as dramatically as possible and, among other things, provide substantial new recreational and social service facilities.

The solicitation process called for developer qualifications and proposals to be submitted to the public parties and jointly reviewed by them. On achieving concensus among the public parties on the preferred development team, the BRA and the BHA are to grant tentative designation for the redevelopment of the Site.

Following tentative designation, the selected developer is to enter into a partnership agreement with the Columbia Point Community Task Force. Also, a Development Agreement will be executed which defines the responsibilities of the developer and the public parties and sets out a schedule for finalizing the development plan.

Considerable subsidy will be required to accomplish the project. When private and public financing is in place and all plans have been reviewed and approved by the public parties, the BRA and BHA will grant final designation and concurrence in conveyance terms.

In response to the Request for Proposals, the public parties received three proposals. It has now been agreed that a joint venture between the two finalists in the developer competition would create a team which draws on the strengths of each and is especially well qualified to undertake this difficult project.

Leading the development team (the "Partnership") as managing general partner will be Corcoran, Mullins, Jennison, Inc., (CMJ) a Quincy firm responsible for the development of over 4,000 units of housing and, in conjunction with others, the new Bayside Exposition and Apparel Centers at Columbia Point. CMJ brings special management and community relations expertise to the project as redevelopers of America Park in Lynn, Massachusetts. Formerly a badly deteriorated public housing project, America Park is now a successful mixed income, integrated community known as King's Lynn.

National Housing Partnerships, a for-profit corporation Congressionally chartered to produce low and moderate income housing, has helped produce over 60,000 such units since its creation under the 1968 Housing Act. Based in Washington, D.C., it brings substantial financial strength to the team.

Peabody Construction Company, Inc. is one of New Englands largest builders, having produced over 13,00 apartments of subsidized housing in the last decade. The Boston-based John B. Cruz, Inc. is Massachusetts' oldest and largest, minority-owned contractor. Housing Associates, a Boston development and consulting firm will serve to coordinate team members and bring a high level of expertise and creativity to the planning and implementation phases of the project.

Finally, the Columbia Point Community Task Force itself will become a general partner in the Partnership after fulfilling its public approval role during the period between tentative and final designation.

Site planning and architectual work will be performed by Goody, Clancy & Associates, Inc., and Mintz Associates Architects/Planners, Inc., both Boston firms.

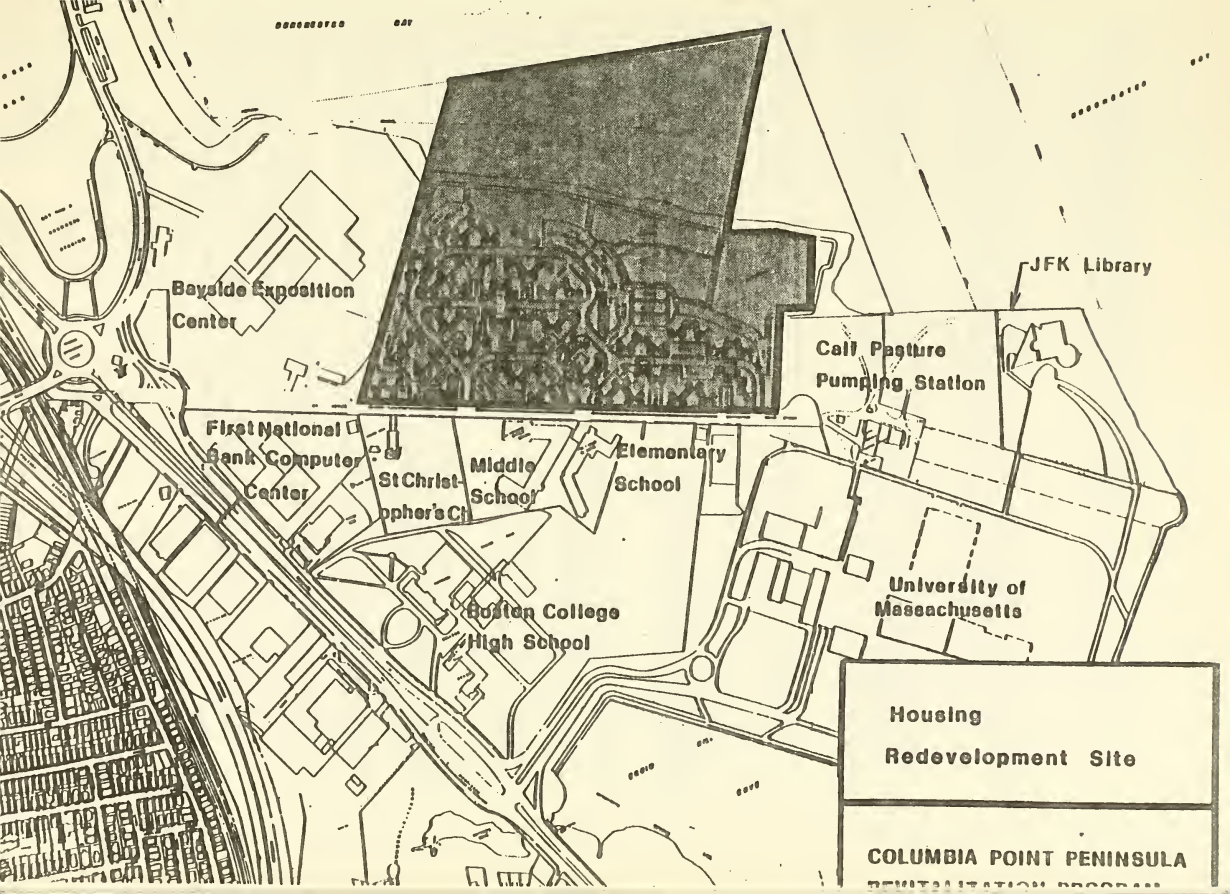
The development team has accepted the terms of the Resident Rehousing Agreement and the Columbia Point Developer Selection Memorandum of Understanding Among the Boston Housing Authority, the Boston Redevelopment Authority, and Columbia Point Community Task Force, Inc., which is before the Authority today and which establishes the requirements for the maintenance of low income housing and protection of the current residents.

Since separate proposals, both excellent, were submitted by the two finalists, certain details of the plan must be revised. It is considered, however, that the development team has ample expertise, experience, financial resources, and commitment necessary to successfully and expeditiously undertake and complete the proposed project. Accordingly, it is recommended that the Authority tentatively designate the Partnership as Redeveloper of the City of Boston parcel and adjacent Boston Housing Authority parcel at Columbia Point.

An appropriate resolution is attached, which resolution contains several conditions of the designation.

Attachments

LA1/LL/100783


Bayside Exposition Center
JFK Library
Calf Pasture Pumping Station
First National Bank Computer Center
St Christopher's Ch
Middle School
Elementary School
University of Massachusetts
Boston College High School
Housing Redevelopment Site
COLUMBIA POINT PENINSULA

RESOLUTION OF THE BOSTON REDEVELOPMENT AUTHORITY
RE: TENTATIVE DESIGNATION OF REDEVELOPER CITY OF BOSTON AND BOSTON HOUSING AUTHORITY PARCELS AT COLUMBIA POINT

WHEREAS, the Boston Redevelopment Authority, hereinafter referred to as the "Authority", has been designated by the Mayor as the City agency responsible for coordinating planning and implementation of public improvements and private redevelopment of the Columbia Point Peninsula; and

WHEREAS, the Authority has entered into a Peninsula Development Agreement with the Boston Housing Authority (BHA) and the Columbia Point Community Task Force (CPCTF) calling for it to jointly plan and develop City of Boston and Boston Housing Authority property (the "Development Site") on the peninsula; and

WHEREAS, the Authority is responsible as Agent for the City of Boston for the administration of $25 million in Urban Development Action Grant Funds, awarded and pending, to be used for public improvements and to assist in the private redevelopment of housing at Columbia Point; and

WHEREAS, the Authority will be called upon throughout the redevelopment of Columbia Point for design review, zoning approvals, tax agreements pursuant to M.G.L. Chapter 121A, and creation and approval of a contemplated Urban Renewal Plan; and

WHEREAS, the Authority is a party to the Columbia Point Resident Rehousing Agreement, dated April 8, 1981 and approved by the United States Department of Housing and Urban Development on September 3, 1982; and

WHEREAS, the Authority participated in the joint issuance of a Request for Developer Proposals on September 12, 1982, as approved by the Authority on August 26, 1982; and

WHEREAS, a Massachusetts limited partnership, hereinafter referred to as the "Partnership" or the "Redeveloper", to consist of Corcoran, Mullins, Jennison, Inc., National Housing Partnerships, Columbia Point Community Task Force, Peabody Construction Company, Inc., John B. Cruz, Inc., and Housing Associates, has submitted a satisfactory proposal for the redevelopment of the Development Site in response to the Request for Developer Proposals; and

WHEREAS, the selection of the Redeveloper has included the participation of the Area and Regional Offices and Headquarters of the U.S. Department of Housing and Urban Redevelopment; and

WHEREAS, the BHA and CPCTF have agreed to tentatively designate the Partnership as Redeveloper of the Development Site;

NOW, THEREFORE, BE IT RESOLVED BY THE BOSTON REDEVELOPMENT AUTHORITY:

1. That a Massachusetts limited partnership, hereinafter referred to as the "Partnership" or the "Redeveloper", to consist of Corcoran, Mullins, Jennison, Inc., National Housing Partnerships, Columbia Point Community Task Force, Peabody Construction Company, Inc., John B. Cruz, Inc., and Housing Associates, be and hereby is tentatively designated as Redeveloper of the Development Site at Columbia Point subject to the Columbia Point Developer Selection Memorandum of Understanding Among the Boston Housing Authority, the Boston Redevelopment Authority, and Columbia Point Community Task Force, Inc., the Request for Developer Proposals jointly issued by the above-mentioned three parties on September 12, 1982, the Columbia Point Resident Rehousing Agreement dated April 18, 1981 and approved by the U.S. Department of Housing and Urban Development on September 3, 1982, and the following conditions:

 a) The submission by the designee within thirty (30) days of the date hereof in form satisfactory to the Authority:

 (i) Duly authorized signature by all partners of the Partnership of the Columbia Point Development Selection Memorandum of Understanding Among the Boston Housing Authority, the Boston Redevelopment Authority and Columbia Point Community Task Force, Inc.; and

 (ii) Letter of Intent to Proceed; and

 (iii) Concurrent with the Letter of Intent to Proceed, an irrevocable letter of credit made payable to the Boston Redevelopment Authority and the Boston Housing Authority in the amount of $100,000 to be held on deposit by the Boston Redevelopment Authority subject to the terms and conditions of the Request for Developer Proposals, dated September 12, 1982; and

 b) The submission by the designee within three (3) months of the date hereof in form satisfactory to the Authority:

 (i) A revised development plan covering financing, interim and permanent management, relocation, construction staging, interim rehabilitation, affirmative action, and social and recreational services; and

 (ii) A finalized design concept and preliminary site plan for the Development Site and a phasing plan; and

 c) Based on the submissions enumerated in paragraph (b) above, execution within three (3) months hereof of a Development Agreement between the Partnership, the Authority, and the BHA, establishing a development schedule and the responsibilities of the developer and the public parties in the implementation of the over-all development plan; and

d) The submission by the Redeveloper within six (6) months of the date hereof of Design Development Drawings; and

e) The submission by the Redeveloper within twelve (12) months of the date hereof evidence satisfactory to the Authority of the availability of firm financial commitments; and

f) Satisfactory negotiation of an agreement between the Redeveloper and the CPCTF regarding the manner of participation of the CPCTF in the development and management of the project; and

g) Satisfactory negotiation of Land Disposition Agreements with the Authority and the BHA within twelve (12) months of the date hereof; and

h) Compliance by the Authority and the Redeveloper with any and all applicable ordinances, statutes, and rules and regulations concerning the protection of the environment, including the recommendations of the Final Environmental Impact Report.

2. That the Director of the Authority is hereby authorized to execute a Development Agreement, described above in paragraph 1(c), on behalf of the Authority.

3. That it is hereby determined that the Partnership possesses the qualifications and financial resources necessary to acquire and redevelop the Development Site in accordance with their proposals and the development guidelines set out in the joint Request for Developer Proposals issued by the Authority, BHA, and CPCTF on September 12, 1982.

4. That all practical and feasible means shall be utilized to avoid or minimize damage to the environment and to minimize the consumption of fossil fuels by the new development.

5. That in the event the Redeveloper does not comply with any part of the schedule set out in above paragraphs (a), (b), (c), (d), (e), and (g), the tentative designation of the Redeveloper may be withdrawn by the Authority.

Columbia Point Development Proposal Summary

Space Program

1,200-1,600 units of housing, including a minimum of 400 permanently guaranteed family and elderly low income units, 400 moderate income units with the balance being market rate.

Limited retail space to service the new community.

New community building and management office building, including space for recreational uses and elderly and other social services.

New and expanded outdoor recreational facilities, including playing fields, pools, walks, and public access to the waterfront via a public recreational easement.

Parking adequate to service the community, partially surface and partially structured.

Site Plan

By demolishing 40-60% of the existing 30 buildings at the site (thereby redistributing available open space), rehabilitating remaining buildings, and selectively adding new construction, the density of the site will be reduced, views to the water opened up, circulation and security improved, and recreation facilities made more accessible. Significant amounts of new landscaping are planned.

Financials

$10 million
20.5 million
Plus

- Urban Initiatives Funds
- Urban Development Action Grant
- Contributed Developer's Fees
- Syndication Proceeds
- U.S. Department of Housing and Urban Development Subsidy
- Massachusetts Executive Office of Communities and Development Subsidy
- Traditional Construction Financing

LA1/GG/100583

APPENDIX E

MEMORANDUM OF UNDERSTANDING

COLUMBIA POINT DEVELOPER SELECTION:

MEMORANDUM OF UNDERSTANDING AMONG THE BOSTON HOUSING AUTHORITY, THE BOSTON REDEVELOPMENT AUTHORITY, AND COLUMBIA POINT COMMUNITY TASK FORCE, INC.

In selecting a Developer for Columbia Point, the three parties (BHA, BRA, and the Task Force) wish to underscore the unique public purpose of this redevelopment effort. Accordingly, this Memorandum of Understanding seeks to reaffirm, through clarification and elaboration, the commitments expressed in the Developer's Kit and in the Resident Rehousing Agreement with regard to the provision and maintenance of low income housing, protection of current residents in relocation, rehousing, and in the operation of the new development, resident participation in project decisions, and resident employment.

The Parties agree to these provisions and intend to condition the selection of a Developer on their acceptance. Further, as a condition of final designation, the Parties will require the Developer to present a plan or plans demonstrating to the satisfaction of all of the Parties how these requirements will be met. These provisions will also be reflected in any land disposition agreements negotiated with the Developer.

I. LOW INCOME HOUSING

A. Preservation of 400 Units

In order to further the redevelopment requirement as stated in Part V of the Developer's Kit that at least 400 low income units must be provided and permanently maintained, at rents not greater than those paid by public housing tenants, the Parties agree to the following points of clarification:

1. The Project will be conveyed or ground leased subject to a ninety-nine (99) year restriction which will require that at least 400 units of the Project will be maintained as affordable rental units for low income households (households eligible for federally-assisted public housing) in a manner consistent with the requirements established by the Parties.

2. The Developer shall agree to: (a) make units available to low income households that are equivalent in design, construction quality, and level of amenities to other Project units and uniformly mixed with units available to other income groups; (b) make units available to low income households that are of appropriate size to meet the needs of households subject to the

Rehousing Agreement and maintain at least the same number and proportion of large (3- or more bedroom) units; (c) make low income units available first to households who are subject to the Rehousing Agreement and second to eligible applicants on the BHA waiting list; (d) maintain a mix of low income households that reflects the economic mix of households at BHA family developments generally; and (e) set and maintain rents for low income households, and for all Columbia Point residents subject to the Rehousing Agreement, in accordance with the percentage of income schedule in effect for federally and/or state assisted low income housing, including all utilities.

3. The Developer shall provide evidence satisfactory to the Parties, as a condition of final designation, that binding public subsidy commitments have been obtained in an amount sufficient to fund the low income component of the Project for the longest period of time available. The Developer shall agree to maintain such subsidies for the full term available, and to utilize all possible steps to extend or renew initial subsidy commitments and/or to secure alternative replacement funding.

4. The Parties shall explore, in conjunction with the Developer, additional mechanisms for securing the low income component of the Project on a permanent basis, including the exercise of reversionary rights and obligations by the BHA.

5. The Developer shall be required to allocate a portion, to be negotiated by the Parties and the Developer, of the net proceeds available from syndication, operation, and resale or refinancing of some or all of the Project to a special trust fund to provide reasonable additional security for the low income component of the Project, to the extent not provided by other means available to the Developer.

B. Public Benefit Fund

Because of the unique public purpose of this redevelopment effort the Parties agree to the following:

1. A Public Benefit Fund will be established to preserve, upgrade and expand the supply of low income housing in the City of Boston. The specific terms and provisions of the trust fund will be subject to negotiation.

2. The trust fund will be funded from: (a) funds set aside to cover operating losses of the Project, to be contributed to the fund following stabilization; (b) the funds referred to in subsection 5 above, to the extent such funds are no longer reasonably required for this purpose; (c) insofar as the Project becomes profitable, a portion, to be negotiated by the Parties and the Developer, of the net proceeds from Project operation and from resale or refinancing of some or all of the Project; and (d) see subsection 3 below.

3. The Parties shall utilize their best efforts to make available to the trust fund any resources generated by the redevelopment effort that are subject to public control, including UDAG loan paybacks and land acquisition fees, ground rents, or note repayment to BHA.

II. REHOUSING AND RELOCATION

Consistent with the purposes of the Resident Rehousing Agreement, which guarantees all households remaining in occupancy at Columbia Point the right to live in a new or substantially rehabilitated unit, the Parties agree to the following points of clarification:

1. The Rehousing Guarantee shall apply to all Columbia Point residents who are recognized by the BHA as leaseholders or as heads of doubled-up households at the time of final Developer designation (§ 2a). The Rehousing Guarantee shall be transferable to another adult member of the household who was reported on the Tenant Status Review most recent to final Developer designation or to a caretaker of remaining household members upon the death or departure of the household head (§ 2f, g).

2. All households subject to the Rehousing Guarantee shall be offered a new or substantially rehabilitated unit of a size appropriate to family needs at the time of rehousing, as quickly as possible (consistent with the economic and racial mix goals established by the Parties) and wherever possible in one move (§ 2d, Developer's Kit, S. IIIB 1).

3. All households requiring temporary relocation shall be offered an appropriately-sized unit, in decent, safe, and sanitary condition, with functional appliances and adequate security. Temporary relocation shall be on-site except by choice of the individual household, and shall be accomplished in a manner that minimizes disruption and inconvenience to residents (§ 2b).

4. In determining the location of temporary and permanent rehousing units, consideration shall be given to medical, employment, and other special household needs. Residents shall receive adequate written notice of relocation and rehousing and adequate time to move.

5. Relocation services and benefits shall be provided for both temporary and permanent moves that are at least equivalent to the services and benefits provided under the federal Uniform Relocation Act or the state relocation act, whichever is greater (§ 2b).

6. The BHA agrees to convey to the Developer only the information contained in the TSRs of the current residents most recent to final designation.

7. Residents shall not be denied temporary or permanent housing unless they are evicted for cause or for non-payment of rent in accordance with the terms of the BHA lease in effect (§ 2c, j).

III. TENANTS RIGHTS AND PRIVATE MANAGEMENT

In order to further the redevelopment commitment as stated in the Developer's Kit to improve the quality of life for existing low income tenants through private management, the Parties wish to assure that the rights and benefits presently available to Columbia Point residents are adequately protected. Accordingly, the Parties agree to the following points of clarification:

1. Low income tenants who reside at Columbia Point under private management shall: (a) continue to pay rent based on income, in accordance with the schedule in effect for federally and/or state assisted low income housing, including all utilities; (b) have the right to remain in occupancy unless evicted for good cause, or such higher standard as required by the applicable subsidy program; (c) have the right to make special rent payment arrangements for good cause; and (d) have the right to appeal eviction actions and other disputes to an impartial Grievance Panel whose structure is to be determined by the Parties. While BHA remains the owner, the applicable rent, eviction, and grievance standards and procedures shall be those in effect for federally assisted BHA housing.

2. Private management policies and programs shall be sensitive to low income residents, and shall reflect the need for (a) flexibility in the enforcement of new standards during the transition from public to private management; (b) recognition of life-style preferences in the establishment of community rules; and (c) providing equality of services and equal access to services by residents of all income groups.

IV. RESIDENT PARTICIPATION

To further the redevelopment objective of providing for strong resident participation in development decision-making and operations, the Parties agree to the following points of clarification:

1. Consistent with the terms of Part V of the Developer's Kit, until such time as the Task Force assumes a legal role in the development/ownership entity, the Task Force shall retain an approval role over all aspects of the redevelopment process similar to the BHA and BRA. The Task Force role shall include, but not be limited to, approval of the development program, and of plans, policies, and

schedules for design and construction, financing and subsidies, management and marketing, affirmative action, tenant services, relocation and rehousing, and project ownership.

2. At the time of final designation, the Developer shall enter into an agreement with the Task Force providing the Task Force with a genuine, strong and active role in all decisions of the ownership entity, including but not limited to decisions governing the development program, design and construction, financing and subsidies, management and marketing, affirmative action, tenant services, relocation and rehousing, and any sale and/or refinancing of the Project.

3. During the period prior to the final Developer designation, the BHA and the BRA shall use best efforts to provide, or assure the provision of, sufficient funding to enable the Task Force to participate equally with the BHA and BRA in the process of tentative and final Developer designation, as provided in Part V of the Developer's Kit, including funding for reasonable organizational expenses and fees for architectural, legal, development, and other technical services. Subsequent to final designation, the Developer shall allocate sufficient funds to enable the Task Force to genuinely and fully participate in decision making along with the Developer, as provided in Section IV herein, including funding for reasonable operating, organizational, and consultant services. Such funding shall be in addition to any funds otherwise designated for tenant services, maintenance of the low income component of the Project, or other purposes as required by the Parties as a condition of disposition.

4. As part of its undertaking with the developer the Task Force will create a plan providing for the representation of new Columbia Point residents as the development becomes occupied. Such plan will assure that the low income residents have a genuine, strong and active role in the overall representation of Columbia Point residents.

V. RESIDENT EMPLOYMENT

In order to further the redevelopment requirement that Columbia Point residents be afforded a fair share of the construction and permanent job opportunities created by the redevelopment process, the Parties agree to the following points of clarification:

1. No less than fifty (50) construction-related jobs shall be provided to (i) current Columbia Point residents, (ii) future low income residents of Columbia Point, and (iii) residents of other BHA developments, in the areas of union apprenticeships, union laborers, and construction management.

2. A comprehensive educational and support services program shall be established jointly by the Developer and the Task Force, and funded by the Developer, to prepare resident workers for apprentice exams and training classes and to facilitate introduction of these workers into the construction trades. The program shall include such elements as: resident recruitment, intake and counseling, orientation, job placement and follow-up, and additional job placement with other contracting/development groups. The program staff shall include an employment specialist and at least one resident position.

3. At least fifty percent (50%) of on-site management positions must be offered to residents, in job categories to be determined jointly by the Developer and the Task Force.

4. Compliance with resident employment requirements shall be monitored in conjuction with comprehensive compliance monitoring program established for affirmative action hiring, affirmative marketing, and MBE utilization.

5. The Developer shall assist the Task Force in organizing a community business enterprise.

6. The specific terms and provisions of the resident employment program will be further defined prior to final designation.

VI. PLAINTIFF CLASS

The parties agree that the plaintiff class in the case of Perez v. Boston Housing Authority shall be a beneficiary of and shall be bound by this Memorandum of Understanding, and the plaintiff class is executing this memorandum for the purpose of confirming the same.

BOSTON HOUSING AUTHORITY

By: _____
Lewis H. Spence
Receiver/Administrator

BOSTON REDEVELOPMENT AUTHORITY

By: _____
Robert J. Ryan, Director

PLAINTIFF CLASS
PEREZ V. BHA

By: _____
Leslie Newman, Lead Counsel

COLUMBIA POINT COMMUNITY
TASK FORCE, INC.

By: _____
Roger Taylor, President

CORCORAN, MULLINS, JENNISON, INC.

By: _____

NATIONAL HOUSING PARTNERSHIPS

By: _____

(Signatures continued on next page)

PEABODY CONSTRUCTION COMPANY, INC.

By: _____

JOHN B. CRUZ, INC.

By: _____

HOUSING ASSOCIATES

By: _____

APPENDIX F

TEST BORING LOGS

CMJ INC

Geotechnical
of Massachusetts, Inc.

Consultants
(617) 685-4800

REPORT

OF

SUBUSRFACE INVESTIGATION

AND

FOUNDATION RECOMMENDATIONS

HARBOR POINT
DORCHESTER, MA
TOWNHOUSES, MALL BUILDINGS, REHAB STRUCTURES

FOR

CORCORAN, MULLINS, JENNISON, INC.
ONE HERITAGE DRIVE
QUINCY, MA

BY:

Michael L. Penney
MICHAEL PENNEY

Samuel A. Fusco
SAMUEL A. FUSCO, P.E.

DATE: 18 JULY 1985
DISTRIBUTION: 10 COPIES - CMJ, INC.

Willows Professional Park • 799 Turnpike Street • North Andover, Mass. 01845

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TABLE I: Summary of Groundwater Observation Well Readings

APPENDIX I: Settlement Calculations
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APPENDIX III: Suggested Methane Venting Scheme

INTRODUCTION

In accordance with our agreement, we have completed a subsurface investigation and geotechnical evaluation of existing conditions at Harbor Point, Boston, MA. The purpose of our work was to develop foundation support schemes for proposed development of new buildings, roadways, parking areas, and utilities, while addressing problems accompanying these concerns. Information in this and subsequent reports will refer to the Subsurface Data book dated 21 June 1985, which contains boring and site data. All design criteria have been based on this material and information pertaining to the proposed construction, renovations and existing conditions at Harbor Point, provided by the Design Team.

EXISTING CONDITIONS/SITE HISTORY

The site of interest is an area of land totaling approximately 5.12 acres in Dorchester, located on the peninsula known as Columbia Point. The site is bordered by Dorchester Bay to the north, Mount Vernon Street to the south, property owned by the City of Boston Sewer Commission to the east and property owned by Bayside Associates to the west. This area of the point was originally a tidal marsh with a Boston City Base elevation of $\pm$0'. Filling of the land, however, began with coking plant wastes from a plant located just shoreward of the site in the early 20th century. This was

then followed by a period of uncontrolled dumping and burning of common refuse and other miscellaneous fill from the 1920's to the early 1960's, with the bulk of the filling occurring in the latter 20 years. Prior to construction of the housing project in 1953, the site was very variable, ranging from elevation $25^{\pm}$ down to elevation $15^{\pm}$ as reported by earlier surveys.

The existing site is relatively flat land occupied by the Columbia Point Housing Project. Site grades in general vary between $15^{\pm}$ and $19^{\pm}$ Boston City Base elevation with $17^{\pm}$ being the average. Boston City Base datum is 5.65' below USGS mean sea level and all elevations referenced herein are based thereon. On the site are 30 brick buildings ranging from one to seven stories, all of which are in satisfactory condition structurally. Current modes of foundation support are timber friction and bearing piles for all but one building, which utilizes spread footings in a modified raft foundation. The Administration Building is also supported on a foundation without piles.

The ground surface on the site, whether paved or covered with topsoil, shows evidence of subsidence varying from moderate pavement cracking and potholes to major differential settlements of 1 - 2' within $\pm$20 horizontal feet. Repaired roadway

areas have behaved well for extended periods of time. Site utilities, including manholes and light poles on the surface have all been affected to some degree by the settlements and in some cases full reinstallation will be necessary. Differential settlements of 6" to 1'6" have occurred directly adjacent to the buildings and pile supported steamlines and concrete utility trenches are very pronounced as differential settlements are again on the order of 3" to 1' and greater.

The roadways were supposedly constructed by excavating and removing all of the fill in sloped back trenches, refilling them with 2 layers of slag into which the sanitary and storm sewers were embedded and then placing granular fill on top of the slag to encase the other utilities and bring the road up to grade. Test pit No. 102 dug in the street near building No. 21 showed fill within the street limits at the edge of the raod. The paved roadway on the bay side of the site has failed due to shoreline erosion even though the slope has been rip-rapped to some extend. This is an area which will require remedial action in view of the erosion potential of the fill.

SUBSURFACE CONDITIONS

With respect to underground exploration at Columbia Point, our B series borings and examination of previous data from this and adjacent sites were utilized to develop the soil profiles shown in the Subsurface Data Book. The exploration

program was based on previous boring locations, proposed building and renovation locations and anticipated subsurface conditions. The borings were drilled to depths which would show suitable bearing strata for the building in question with the density of locations depending on the size and number of proposed buildings in the area.

The borings requested by Geotechnical Consultants were performed by Soil Exploration Corporation between November 1984 and June 1985 using hollow stem augering and washed casing techniques to advance the boring. Split spoon sampling was then performed in accordance with ASTM requirements for the Standard Penetration Test. The sampler was advanced by blows from a 140 pound weight free falling 30 inches, with the number of blows required to provide 6" increments of penetration over an 18" or 24" run recorded. The summation of the blows needed to drive the second and the third increments is called the Standard Penetration Number and this is used as an indicator of the soils bearing capability. Samples were taken at 5' depth intervals for all the borings not driven to refusal. For the deeper refusal holes, samples were taken at 5' intervals only in the changing upper soil and fill layers, while only occasional disturbed samples and undisturbed Shelby tube samples were taken in the blue clay

layer, as more or less constant conditions prevailed. The Shelby tube samples were taken in our first B series of borings between November 1984 and January 1985 to obtain undisturbed substrata samples for testing, which allows predictions of actural in-situ behavior characteristics of the soil. Water level observations were also made at the completion of each hole and were recorded on the logs.

Harbor Point lies over a more or less typical soil profile similar to other areas on the Point constructed over a land fill, generally including miscellaneous fill followed in some cases by a peat layer representing the surface of the old tidal marsh, then a medium dense glacial outwash sand layer, over a substantial depth of blue-grey clay deposited in a marine environment, which is in turn underlain by very dense glacial till and/or Argillite bedrock.

Specifically, the characteristics of the substrata are as follows:

A. The miscellaneous fill is quite organic in nature consisting of household rubbish including glass, paper, metal, plastic, rubber, wood, ash, cinders, and other random material including brick, concrete, sand, silt, wire, wood, slag, asphalt, grass, coal, gravel, and metal. The layer of fill varies over the site from

$3'^{\pm}$ to $25'^{\pm}$ with an average of $16'^{\pm}$. Blow counts for this material are extremely variable, owing to the variability of the fill itself, which renders this layer unacceptable for any major bearing capacity due to the settlement potential, which has already been shown to be a problem.

B. The silty peat layer varies in consistency from very soft to medium stiff and in content from mostly black organic silt to a very fibrous clayey peat and silt, usually exhibiting a strong odor. The thickness of this layer varies from $0'^{\pm}$ to $8'^{\pm}$ although it was at times difficult to distinguish the change from the fill to the silty peat and thus in some cases the layer may be slightly thicker or thinner than recorded, or be present where recorded as absent. This layer, like the fill above, is unsuitable as a bearing material, again because of its potential to compress and generally very weak load supporting ability.

C. The sand layer present under most of the site is the first layer encountered below grade with any structural integrity. The sand is a grayish brown to tan medium dense to very dense deposit with some erratic stiff clay lenses exhibiting relatively uniform bearing strength.

The thicknesses range from $5^{\pm}$ feet to $40^{\pm}$ feet with an average being about $15'^{\pm}$.

D. The clay below the sand is commonly referred to as Boston Blue Clay and is found around much of the Boston area and thus its characteristics are rather well documented. This layer extends $90'^{\pm}$ to $230'^{\pm}$ below grade, varying in consistency from soft to stiff except directly beneath the sand layer, where in most cases the clay was more yellow in color and significantly harder than at greater depths. This is the result of being dried out while exposed to air during earlier glacial periods, resulting in strengthening and discoloration of the superficial layer, then gradual change back to the weaker blue clay with depth. The clay is interspersed in places with lenses of fine sand, which is an important factor when considering the compressive capabilities of the clay, as these lenses will allow the dissipation of pore pressure within the clay and thus effect the rate of consolidation.

E. Underlying the clay is a layer of very dense gravelly and bouldery glacial till followed by Argillite bedrock. The till is a heterogeneous mixture of sand, gravel, silt, clay, cobbles and boulders. It is generally

dense to very dense and will provide an excellent bearing material for deep foundation systems.

F. Groundwater observations were made over a period of six months in observation wells G1, B2, B3, and B4. It should be noted that all of these wells are relatively close to the bay with respect to the site as a whole. The data gathered from these wells suggest no major fluctuation of levels due to tidal influence, although it could be concluded that levels do coincide with tidal phases causing changes in readings of 2 - 4 feet. The highest and lowest Boston City base groundwater elevations were 10.6' and 4.2' respectively. The readings are presented on the attached tabulation sheet.

Examining the site as a whole, water levels taken upon completion of borings ranged from 7' to 16' below grade with an average of 10.5' below grade. These depths correspond to elevations of 2.25' to 10.5' with an average elevation of 7' Boston City Base. Even though these readings were taken upon completion of the borings, they can be taken as representative since the fill, in which the water level occurred most of the time, is permeable enough to allow the water table to stabilize during boring operations. Because of the permeable

nature of the fill, excavation work deeper than ±7' below grade will require dewatering. Inconsistency of the fill material and its method of placement may account for the general variability of the water table readings along with prior weather conditions, and this same inconsistency suggests that excavations may have to be braced at shallower than normal depths or overexcavated and sloped back to acheive stability.

PROPOSED DEVELOPMENT

Development of this site will involve demolition of seventeen (17) of the existing buildings, rehabilitation of thirteen (13) of the existing buildings, construction of four (4) mall buildings, twenty-five (25) townhouse structures, three (3) new midrise buildings with garages, two (2) new stepped midrise structures, a clubhouse and a community building.

The site has been sectioned into various blocks and each building has been given a designation. Following is a tabulation of the proposed development:

Block Number	Building Number	Building Type
1	1-1	Stepped Midrise
	1-2	Townhouse
2/3	2-1	Townhouse
	2-2	Townhouse
	3-1	Townhouse
	3-2	Townhouse

Block Number	Building Number	Building Type
	3-3	Townhouse
4	4-1	Townhouse
5	5-1	Midrise with garage
6	6-1	Clubhouse
7	7-1	Midrise with garage
8	8-1	Townhouse
	8-2	Townhouse
	8-3	Townhouse
9	9-1	Stepped Midrise
	9-2	Townhouse
10	10-1	Mall Building
	10-2	Townhouse
	10-3	Townhouse
11	11-1	Mall Building
	11-2	Townhouse
	11-3	Townhouse
12	12-1	Mall Building
	12-2	Townhouse
	12-3	Townhouse
	12-4	Townhouse
13	13-1	Townhouse
	13-2	Townhouse
	13-3	Townhouse
	13-4	Townhouse
14	14-1	Mall Building
	14-2	Townhouse
	14-3	Townhouse
	14-4	Townhouse
15	15-1	Rehab. Midrise
	15-2	Midrise with garage

Block Number	Building Number	Building Type
16	16-1	Rehab
17	17-1	Rehab
18	18-1	Rehab. Elderly
19	19-1	Rehab
20	20-1	Rehab
	20-2	Rehab
	20-4	Community Building
21	21-1	Rehab
	21-2	Rehab
22	22-1	Rehab
	22-2	Rehab

Site development will include construction of roadways, parking lots, landscaped areas and installation of utilities to service the buildings.

ANALYSIS AND CONCLUSIONS

This report specifically excludes the stepped midrise buildings 1-1 and 9-1, as well as the midrise with garage buildings 5-1 and 7-1. These structures will be discussed in a separate foundation report.

FOUNDATIONS

To deal with the topic of building support, several factors must be given consideration. The first is the presence of relatively deep unsuitable material at the surface of the site. This means that any support scheme is going to require deep

foundation components, namely piles, and attention to related concerns such as dewatering, excavation, bracing, and dealing with the particular variabilities of the fill such as local obstructions. Another factor which could have a significant incluence on the foundation design is negative skin friction on piles. This occurs when the material surrounding a pile, which would be the fill and peat layers in this case, settles relative to the pile itself, causing additional vertical loading of the pile beyond the building load. This force would be even greater should final site grades require placement of additional material on the existing fill, therefore increasing the settlement. Finally, settlements of the buildings due to compression of the clay layers beneath the sand bearing layer should be expected. These settlements should be significantly more uniform than any fill settlements due to the nature of the clay and they must be small enough to be tolerated by the particular structure or else another means of pile support will be required, namely deep friction piles or very deep end bearing piles down through the clay layers. Since the existing buildings have behaved very well under these conditions, settlement due to the clay is not being anticipated as a major obstacle in the building design.

One situation that must be addressed is the settlement of the ground relative to the buildings, in particular where

utility connections enter into the buildings. Because supporting all the utilities in deeper bearing layers would be very expensive and impractical, considerations must be made to allow for the differential settlement at the building-fill interface. Briefly, provisions will have to be made to allow movement of the utilities so that breakage does not occur. This may entail flexible joints at the building interfact, flexible joints inside the building with oversize access holes where they enter the foundation, and/or concrete aprons extending away from and connected to the building to provide support to ensure any bending occurs over a long enough length to prevent damage.

We consider that as long as settlements can be kept uniform, problems will be kept to a minimum. This will require careful attention to construction methods such as type of fill and compaction, taking care to include all areas of concern. In turn, if uniform settlement of the roadway is allowed, pile supported utilities will be undesirable beneath the road, as is presently the case at Columbia Point, since severe humping may occur. Instead, utilities which may need pile supports should be located outside of the road areas as much as possible. Utility support will be addressed in a later section of this report.

The type of settlements intrisic to the biodegradation and/or further loading of the fill and peat layer will probably best be dealt with by an aggresive maintenance schedule. This includes areas of building access such as driveways, curbs, and stairways as well as in the roadway itself, since it may be impractical to try to excavate all unsuitable material completely; i.e., a substantial savings may be achieved by planning to make minor road repairs as required. Precompressing the unsuitable material via surcharge loading may be feasible to compress the peat layers and the fill to some extent, however further biodegrading and settlement of the fill after preloading is very possible.

This report deals with support schemes for the townhouses, the mall buildings, and the rehabilitated structures only. The higher buildings will require more in-depth study and further testing of the clay substrata since settlement will control whether or not the buildings can be founded on the upper sand layer or require deep end bearing piles. For the lower buildings and subsequent smaller loadings, the following schemes are available for building support, all of which utilize the sand layer or the stiff upper layer of the blue clay for bearing support.

1. Excavation and Replacement: This involves removing all of the unsuitable material within the lines of stress distribution from the foundation footing down to the sand or stiff clay bearing layer and then recompacting structural fill in the dry back up to footing grades while under constant supervision by qualified personnel. The problems with this method are that unless sheeting would be used to brace the walls, the excavations would have to be sloped back tremendously to achieve stability of the fill, and, due to its permeability, dewatering would be a major task. Finally, the tremendous volume of the fill removed would present a conceivably large excavation and disposal cost for an average depth of ±18' below grade, as well as purchasing and compacting the necessary structural fill.

2. Deep Spread Footings: The use of spread footings on the sand or stiff clay layer would be impractical and expensive since deep trenches would have to be excavated and braced or sloped back, then dewatered to place the footings, followed by the pouring of piers which would approach 30' high in some places. In some cases the pier itself would be adding as much or more to the weight bearing on the footing than the building loads.

3. Caissons: A caisson is a cased drilled hole concrete filled with cross sectional dimensions being larger than a typical pile, on the order of 3 or more feet. Bearing capacity is achieved through skin friction and the cutting of a bell at the base of the pipe larger than the diameter of the casing itself to increase the surface area. Because of the sands at the site overlying the clay, the bell would have to be formed deeper into the clay. Also, drilling the casing through obstacles in the fill could be very difficult whereas a smaller diameter object would not be subject to as much restriction. The use of caissons is also much more dependent on accurate subsoil data for each member location to determine belling depths and the Harbor Point site is too large to have warranted that amount of borings. The site variability also favors other methods which aren't as effected by changing substrata conditions.

4. Friction Piles: Piles driven to certain depths in the sand and clay will develop considerable strength when the clay has "set" after the initial disturbance caused by driving. This, and the soil pressures existing against the larger skin surface area of the pile, creates the friction which will support loads, depending on the depth driven. For this method, many different pile types are appropriate, however, as building loads increase the cost becomes somewhat less feasible

since a longer and/or larger pile is needed to withstand soil pressures developed by driving the pile deeper to attain the required resistance. Wood piles currently used at the housing project have performed very well as is evidenced by the existing structural condition of the buildings, and examination of the in-situ piles indicated that they were in excellent condition (see attached report). Friction piles are a feasible alternative for the foundations requiring shallower depths to achieve necessary support.

5. Pressure Injected Footings: Because a relatively dense sand layer exists throughout the site, varying in depth and somewhat in density, a situation is present which lends itself to the consideration of pressure injected footings (PIF). While a friction pile would have to pass through the layer and receive the majority of its bearing capacity through contact with the clay, a PIF would bear in the sand, utilizing the strength of the layer and requiring fewer members to provide adequate bearing strength at shallower depths.

Installation of a PIF involves the further compaction and thus strengthening of the sand as concrete is rammed down a driven casing until a specified driving pressure is reached, forming a bulb of concrete at the end of the pile. This bulb

distributes the pile load in the sand layer and into the stiffer upper blue clay layer thus eliminating "punch" failures. Boring data of the site shows very adequate sand strata except for a small localized area under buildings 10-1 and 10-2 where borings No. 5 and B-118 show ±5' of sand. We still consider this to be acceptable as long as the PIF contractor is made aware of this fact and takes care not to drive the concrete through the sand.

Because of the shallow depth to the sand layer and the higher capacity of a bulb pile, this system is felt to be the most economical and time efficient and is the one we recommend for every foundation covered by this report. It should also be noted that PIF have been used successfully at the University of Massachusetts Athletic Facility and Ice Rink which exhibits substrata conditions very similar to those at the housing project. An analysis of the expected settlements resulting in the Blue Clay from the loadings is on the order of a ½" for the townhouses and 1" for the mall buildings. These translate to maximum differential settlements of ¼" and ½" respectively, which are generally acceptable for these types of building. The settlement calculations have been included herewith for reference.

Although a fairly large amount of subsurface data exists pertaining to the Housing Project specifically and Columbia Point in general, any underground work based on the soil profiles should bear in mind the characteristics of the site and the interpolations made. Some borings hundreds of feet apart show nearly identical soil conditions while others show important differences within 50'. Therefore, proper field engineering inspection and testing should be maintained in view of this fact unless further boring programs are to be implemented which we do not feel would be cost effective.

6. End Bearing Piles: Piles driven to end bearing in the till would obviously be uneconomical for the load capacity requirements for these buildings. End bearing in the sand layer overlying the clay would result in very low capacity units to avoid punching failure and they would not be capable of resisting horizontal load due to the weak soils overlying the sand.

Summarizing the foregoing discussion, we consider that excavation/replacement, depressed footings, caissons and end bearing piles are not appropriate for this particular application. Friction piles are acceptable but not considered economical due to the depth requirements and installation problems anticipated. We conclude that cased pressure injected footings

bearing in the dense sand over the Boston Blue Clay will provide the most economical appropriate foundation system for the townhouses, mall buildings and rehab structures. PIF capacities of 45 and 120 tons will be used for the townhouses and mall buildings, respectively.

FLOOR SLAB

Subsurface conditions include weak fill material and soft organic soils over the entire site. These materials will compress under the weight of added loading from a floor slab dead load and live load if cast on-grade for support. Therefore, all ground floors must be designed as structurally supported slabs.

A series of alternative schemes are available ranging from wood or precast concrete over a crawl space to cast-in-place concrete on earth. The evaluation of the floor system most economical for this development relates to the requirements for methane handling as discussed in another section of this report. Basically, it has been determined that a reinforced concrete slab cast on-grade and supported by the foundation will be the most economical from a construction point of view. This would lead to a methane system using crushed stone fill to reach slab subgrade level for casting the floor concrete.

METHANE

Construction on landfill areas involves a particular problem aside from settlements, and this is the anaerobic production of gases within the fill, of which methane is a cause for concern. Methane is a tasteless, colorless, and odorless non-toxic gas which can form explosive mixtures with air at ordinary temperature and pressure while within a specific range of concentration. These explosive limits are 5% to 15% methane by volume in air, with concentrations above and below this range being non-explosive and safe as long as the concentration is stable. Methane is produced by bacterial action within the fill, the rate of which depends on the stage of decomposition of the fill. Methane is heavier than air but will expand to the surface depending on production rate within the fill, temperature, groundwater levels, barometric pressure, and construction activities such as excavation. Being heavier than air, the gas tends to collect in areas such as basements where exposure to open flame could cause very serious explosions at the right concentration.

Because Harbor Point contains refuse fill depths of up to 25', the potential for methane production is quite high, although numerous landfill studies have shown concentration of the gas to drop off with time. Concentrations of methane detected in

the crawl spaces of the buildings at the Housing Project were virtually undetectable after a period of roughly 5 years, even though dangerous levels were present in earlier stages. Various tests taken during the earlier B series borings and at some of the B 100 series borings detected methane while many did not. Because of the unpredictability of any land-fill's stage of biodegration and the absence of supportive scientific studies into the topic of methane control, we consider that precautions must be taken to prevent the build up of any potentially explosive methane/oxygen mixture under all the buildings. Since the rate of methane evolution is erratic and there is no feasible means to suppress the methane generation, combustable gases must be collected and disposed of harmlessly.

The proposed system is not very cost intensive and involves the placing of crushed stone to a depth of ±1½' beneath the floor slab then covering the stone with a heavy gauged impervious plastic blanket to prevent any gas from escaping up through the slab. Within the stone is a layer of perforated collection pipes which draw air and methane from the stone voids and expels them at the roof of the building. Venting will be placed in the foundation wall to allow air into the collection bed. The purpose of the stone is to create small voids for any gas mixture to occupy as opposed to an open

crawl space. A small void space discourages the propagation of an explosion significantly. Also by nature of air movement through the voids, static layering of gas would be reduced or eliminated.

We recommend that the beds be monitored periodically to ensure that the system is serving its purpose so that remedial action could be taken if necessary. This action may involve collection and testing of a sample of the mixture at the turbulator vent pipe to determine the methane concentration. If the concentration is near or within the explosive range, mechanical units can be used to expel or inject air to alter the concentration.

UTILITIES

Concern for utilities at Harbor Point in view of existing conditions discussed earlier presents some rather unique design considerations. The obvious problem is settlement and its effect on the utilities. To deal with this, major utilities sensitive to grade changes such as storm and sanitary sewers should be designed with maximum slopes so that in the event of any differential settlement, they can continue to function within their design loadings. As long as this is done, we would not request surcharging of the utility bed areas since such a large amount of material would be needed for preloading,

the majority of which would then have to be hauled off site. We also feel that pile support of these utilities is not required as long as they are "oversloped" to provide for settlement. Total excavation and replacement would also be impractical and expensive for most instances.

Most of the major utilities will be bedded within the roadway areas, so if the time and materials were available for surcharging, it could serve the dual purpose of consolidating the fill, and peat to some extent, for both the roadway and the utilities, and thus in this event may be feasible. Where the elevations of the sewers are close to the upper limits of the sand or clay layers, total excavation of the unsuitable material should take place, then compaction of structural fill begun from this point. Because of the possible variability of the depth to suitable material, judgement by the engineer in the field should be used as to when this procedure would be practical, otherwise the pipes should be bedded and surrounded by structural fill.

Minor utilities such as water mains, electrical and telephone service, and gaslines are not as sensitive to settlements in that they are somewhat more flexible. What will be necessary for all these utilities except perhaps the telephone and

electrical service, is embedment in structural fill, compacted in the dry on a heavily proofrolled surface. This will help prevent differential settlements while keeping potentially corrosive chemicals in the fill material from being in direct contact with the utilities. Placing the utilities in concrete conduit boxes or using high strength flexible components is also advisable to minimize the effects of settlement. Any utility buried directly in the fill which can tolerate significant amounts of bending such as the telephone and electrical service should be protected from direct contact with the fill; PVC conduit has been used successfully at the University of Massachusetts Campus.

As discussed earlier, utility connections should be constructed to tolerate considerable movement. Although it is impossible to know exactly what magnitude of settlements to expect, the building/fill interface is probably the most critical area of the system and flexible joints and oversized foundation entrance sleeves would be the most economical method of dealing with the movement. Utility lines then entering the building or running under it should be hung from the slab since the slab will not settle with respect to the foundation wall, although the material beneath the slab might. Light poles, hydrants, catch basins, and manholes should all be

underlain and surrounded by compacted structural fill, making the bases large enough to prevent tilting. These should also be incorporated within other areas of structural fill, such as roadways, whenever possible to take advantage of the strength offered by the compacted soil mass and resistance to differential settling.

Regardless of the systems implemented, movements should be anticipated, although we don't foresee any of them as being extreme. Again, an aggressive maintenance program should be put in effect to remedy any problematic conditions and systems should be constructed with ease of maintenance service in mind.

SITE GRADING/PAVEMENT

Because of the compressible nature of the site soils, it has generally been recommended that no rise in existing grade be made. Any added fill will initiate consolidation of the organic soils and clay as well as compression of the refuse fill. Thus, if grades must be raised, some magnitude of settlement must be expected.

The effect of site settlement extends to the foundation loading due to negative skin friction produced by the relative movement

of the fill and peat downward along the length of the piles. For new foundation piles, this load can be considered in the design as part of the pile capacity, however, for existing piles, no modifications are possible. The magnitude of the dragdown loading is on the order of 1 to 3 tons depending on the depth of fill and peat. This is easily handled for the new piles but marginal for the existing piles since their actual capacity is unknown.

Site design must minimize grade changes, however, where necessary, other structural unloading should be considered in order to offset the dragdown load. Perhaps grade depression in adjacent areas or load removal over the effected piles could be accomplished. In the absence of unloading procedures, a certain degree of risk will be associated with the additional loading of existing piles. Since the pile condition appears to be excellent and typically these piles can sustain loads in excess of 18 tons as they were designed for, the risk may not be great, however, because no evidence of the pile driving procedures or actual capacities is available, the risk cannot be evaluated with any confidence.

With regard to paved areas, it is impractical to consider total excavation and replacement with compacted granular fill

to create a stable base. Surcharging could be used to pre-compress areas although time and surplus material is required to effect this procedure. If surcharging is not feasible due to time restraints, we suggest that heavy proofrolling be accomplished to "densify" the subgrade as much as possible and fix any weak spots. The pavement section should include 6" to 12" of granular base course with 3" to 4" of dense graded crushed stone over the base course and 3" of bituminous concrete thereon. This section will distribute loading to minimize the pressure on the subgrade materials. Some settlement and distortion of the pavement must be expected and a maintenance program will be required to repair pavement in the future.

RECOMMENDATIONS

Following is a summary of recommendations for site development and foundations for all buildings except the stepped midrises 1-1 and 9-1; and the midrise structures with garages, 5-1 and 7-1. The midrise buildings will be discussed in a separate report:

1. Use pressure injected footings (PIF) for all building foundations bearing in the dense sand layer overlying the Boston Blue Clay.

2. Use PIF capacities of 45 tons and 120 tons for the Townhouses and Mall Buildings, respectively.

3. Use a reinforced concrete structural floor slab supported on the foundation and cast on-grade for all buildings.

4. Provide a methane venting system under all slabs consisting of a bed of crushed stone covered with a vapor barrier and containing perforated PVC pipe for collection together with inlet vents for air supply and a turbulator for dissipation.

5. Include a dragdown allowance of 2 tons per PIF for all new foundations.

6. Minimize the raising of any site grade since settlement and dragdown forces will result.

7. Evaluate time and material requirements for surcharging roadway and utility alignments to pre-compress fill and peat.

8. Heavily proofroll pavement subgrades, repair weak spots, place 6" to 12" of granular base course, 3" to 4" of dense graded crushed stone and 3" of bituminous concrete all in accordance with Massachusetts DPW Specifications.

9. Encase buried electrical cable in PVC conduit to avoid contact between the cable and the refuse fill.

10. Provide a bedding of at least 12" of compacted gravel beneath all utilities and backfill all trenches with compacted granular soil.

11. Where utility excavations extend close to the peat level, remove the peat to the top of sand level and backfill with acceptable granular material to the surface.

12. Provide flexible connections and oversized sleeves where utilities pass through foundation walls.

13. Support all underslab utilities from the floor.

14. Dewater and brace all excavations as necessary to maintain safe dry conditions for construction.

15. Establish a maintenance program for repair of pavement, regarding settled areas and remedial work for utilities.

16. Consider installation of slope protection along the shoreline where erosion is taking place.

17. Provide field inspection and testing to monitor foundation construction and fill installation.

SUMMARY OF GROUNDWATER OBSERVATION WELL READINGS

	WATER ELEVATION (BOSTON CITY BASE)				
	OBSERVATION WELL NUMBER				
DATE	G1	B2	B3	B4	TIDE
12-8-84	7.6	10.4	10.6	DRY @ 7.9	9.5
12-17-84	6.8	6.5	8.3	DRY @ 7.9	6.0
1-11-85	6.1	4.3	7.6	DRY @ 7.9	2.9
1-18-85		4.2	7.6	DRY @ 7.9	0.2
1-23-85	5.7	4.2	7.5	DRY @ 7.9	2.5
4-18-85	6.0			DRY @ 7.9	1.3
4-18-85		6.4			5.1
4-18-85			8.2	DRY @ 7.9	7.1
5-16-85	6.8	6.7	8.5	DRY @ 7.9	3.3
5-29-85	8.3	8.4	9.5	DRY @ 7.9	6.8
6-4-85	8.8	8.9	10.2	DRY @ 7.9	7.7
6-24-85	6.7	4.2	8.1	DRY @ 7.9	0.3

APPENDIX I

Geotechnical
of Massachusetts, Inc.

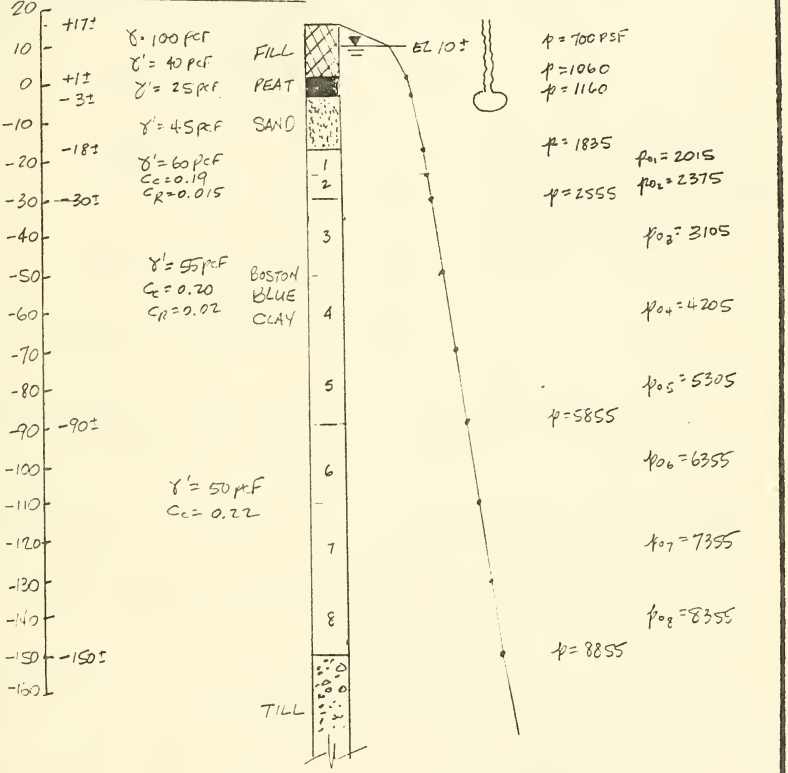
Consultants
(617) 685-4800

PROJECT HARBOR POINT
BY SOJ DORCHESTER, MA

DATE 7/16/85 SHEET 1 OF 4
JOB NO. 843753 SCALE

SETTLEMENT

TYPICAL SECTION



Geotechnical
of Massachusetts, Inc.

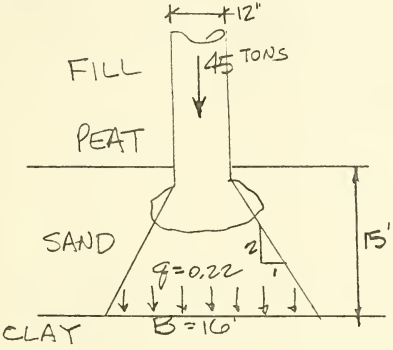
Consultants
(617) 685-4800

PROJECT HARBOR POINT
BY SJH DORCHESTER, MA

DATE 7/16/85 SHEET 2 OF 4
JOB NO. 843,753 SCALE

EVALUATE STRESS DISTRIBUTION

A. 45T CAPACITY FOR TOWNHOUSE (130' x 33' AVG±)



FOR 16½' ± SPACING OF BEARING WALLS, STRESS WILL OVERLAP ABOUT AT TOP OF CLAY LAYER.

CALCULATE SETTLEMENT FOR UNIFORM LOAD OF $45^T/(\pi 16\frac{3}{4})=0.22$ TSF = 440 PSF

SECTION A

EL -18 TO -30 $H = 12' \times 12' = 144''$

$p_o = 2195$ PSF = 1.1 TSF

$\Delta p = 195 \times .005 \times 0.22 = 0.21$ TSF (FROM NEWMARK CHART)

$$S_A = \frac{0.02}{1+.9}(144)\log\frac{1.1+0.21}{1.1}$$

$$S_A = 0.12''$$

SECTION B

EL -30 TO -90 $H = 60' \times 12'' = 720''$

$p_o = 4205$ PSF = 2.10 TSF

$\Delta p = 92 \times 0.005 \times 0.22 = 0.10$

$$S_B = \frac{0.02}{1+.9}(720)\log\frac{2.1+.10}{2.1}$$

$$S_B = 0.15''$$

SECTION C

EL -90 TO -150 $H = 60 \times 12'' = 720''$

$p_o = 7355 psf = 3.68 TSF$

$\Delta p = 2E \times 0.005 \times 0.22 = 0.03 TSF$

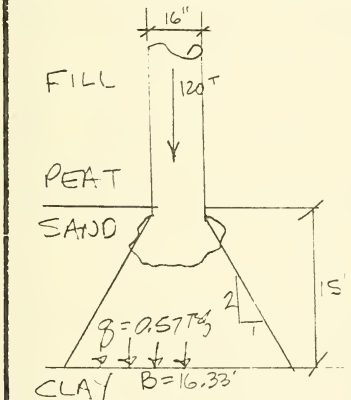
$S_c = \frac{0.22}{1+.9}(720)\log\left(\frac{3.68+.03}{3.68}\right)$

$S_c = 0.29''$

$S_T = 0.56''$

SAY $\frac{1}{2}''$

B. 120^T CAPACITY FOR MALL BUILDINGS (250' x 36' A/C±)



FOR 25' SPACING OF BEARING WALLS, STRESS WILL OVERLAP AT ABOUT ELEVATION -30±

∴ CALCULATE INDIVIDUAL PIP SETTLEMENT ABOVE EL -30± & COMBINED EFFECT BELOW EL -30±.

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PROJECT HARBOR POINT
BY SMJ DORCHESTER, MA

DATE 7/16/85 SHEET 4 OF 4
JOB NO. 843753 SCALE

FOR B = 16.33'

BOUSSINESQ STRESS DISTRIBUTION

@ K_2B $q = 0.7 \times 0.57 = 0.40$ TSF

@ B $q = 0.35 \times 0.57 = 0.20$ TSF

$$S = \frac{0.015}{1+.9}(12\times12)\log\frac{1.1+.4}{1.1} = 0.15''$$

(INDIVIDUAL PIF)

UNIFORM AREAL STRESS @ EL -30 IS:

B = 26.33' P = 120T $q = 0.22$ TSF

SECTION 1

EL -30 TO -90 H = 60' x 12 = 720"

$p_o = 4205$ PSF = 2.0 TSF

$\Delta p = 104 \times .005 \times .22 = 0.11$ TSF

$$S_1 = \frac{0.02}{1+.9}(720)\log\frac{2.1+.11}{2.1}$$

$S_1 = 0.17''$

SECTION 2

EL -90 TO -150 H = 60' x 2 = 720"

$p_o = 7355$ PSF = 3.68 TSF

$\Delta p = 48 \times .005 \times .22 = 0.05$

$$S_2 = \frac{.22}{1+.9}(720)\log\frac{3.68+.05}{3.68}$$

$S_2 = 0.49''$

$S_T = .49 + .17 + .15 = 0.81''$

SAY 1"

CONSOLIDATION TEST RESULTS

PROJECT : COLUMBIA POINT HOUSING
LOCATION : DORCHESTER, MA
BORING : B-1 SAMPLE : U-1 DEPTH : 27'
SOIL : VERY STIFF GREY SILTY CLAY, TRACE FINE SAND
INITIAL THICKNESS (INCHES) : 1"

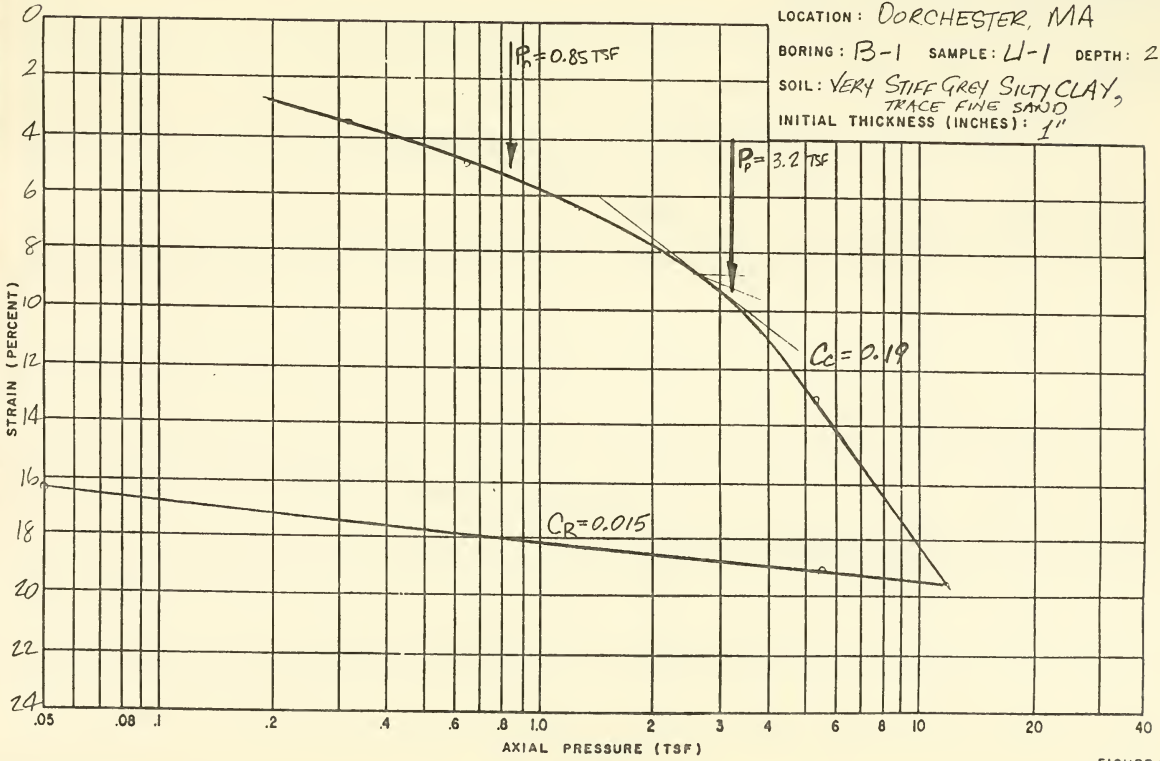
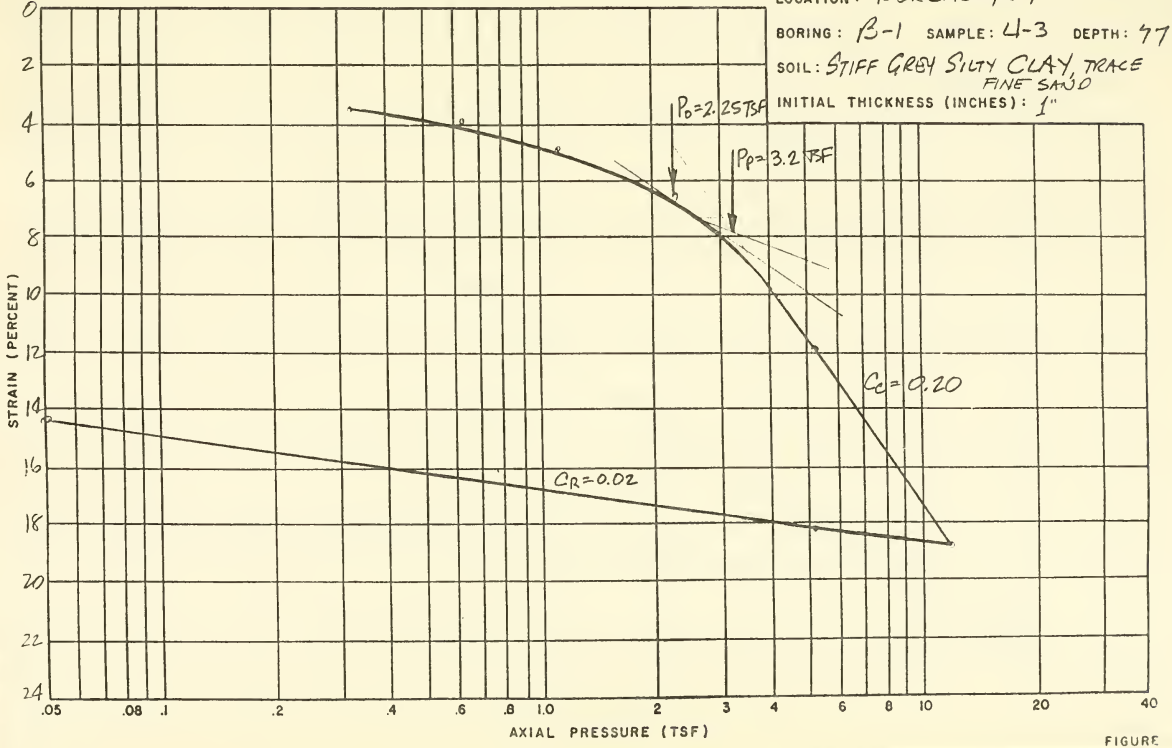


FIGURE :

CONSOLIDATION TEST RESULTS

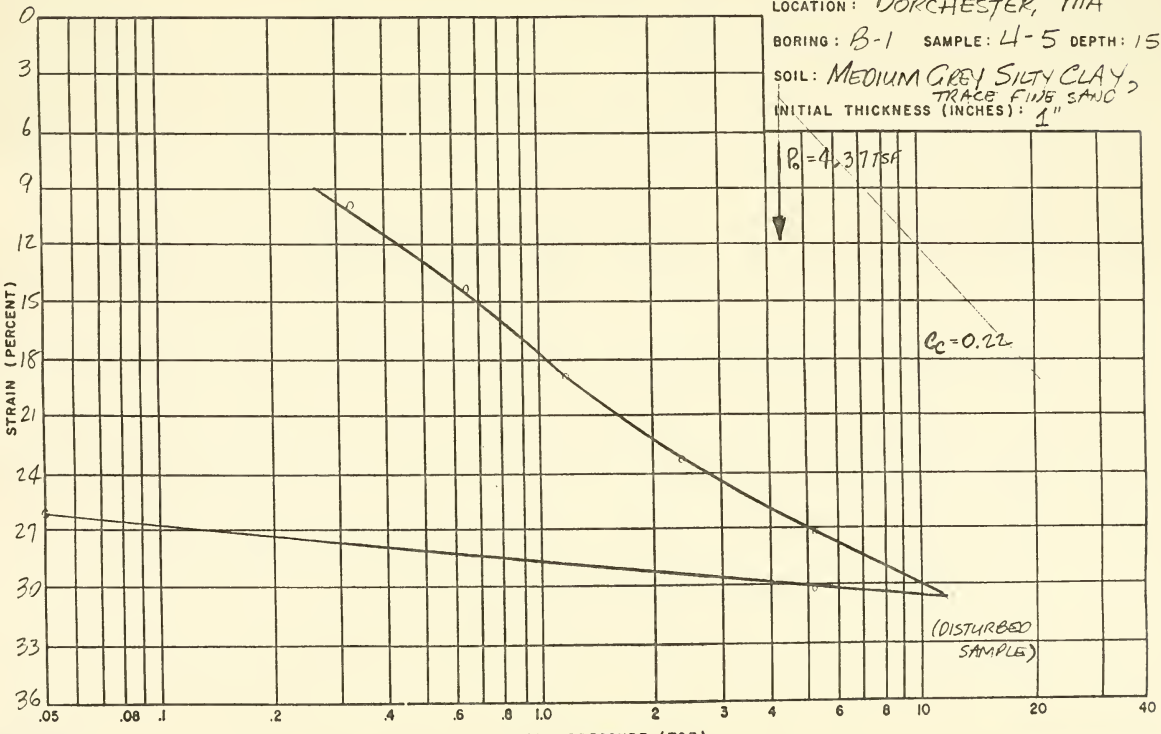
PROJECT : COLUMBIA POINT HOUSING
LOCATION : DORCHESTER, MA
BORING : B-1 SAMPLE : 4-3 DEPTH : 77'
SOIL : STIFF GREY SILTY CLAY, TRACE FINE SAND
INITIAL THICKNESS (INCHES) : 1"



FIGURE

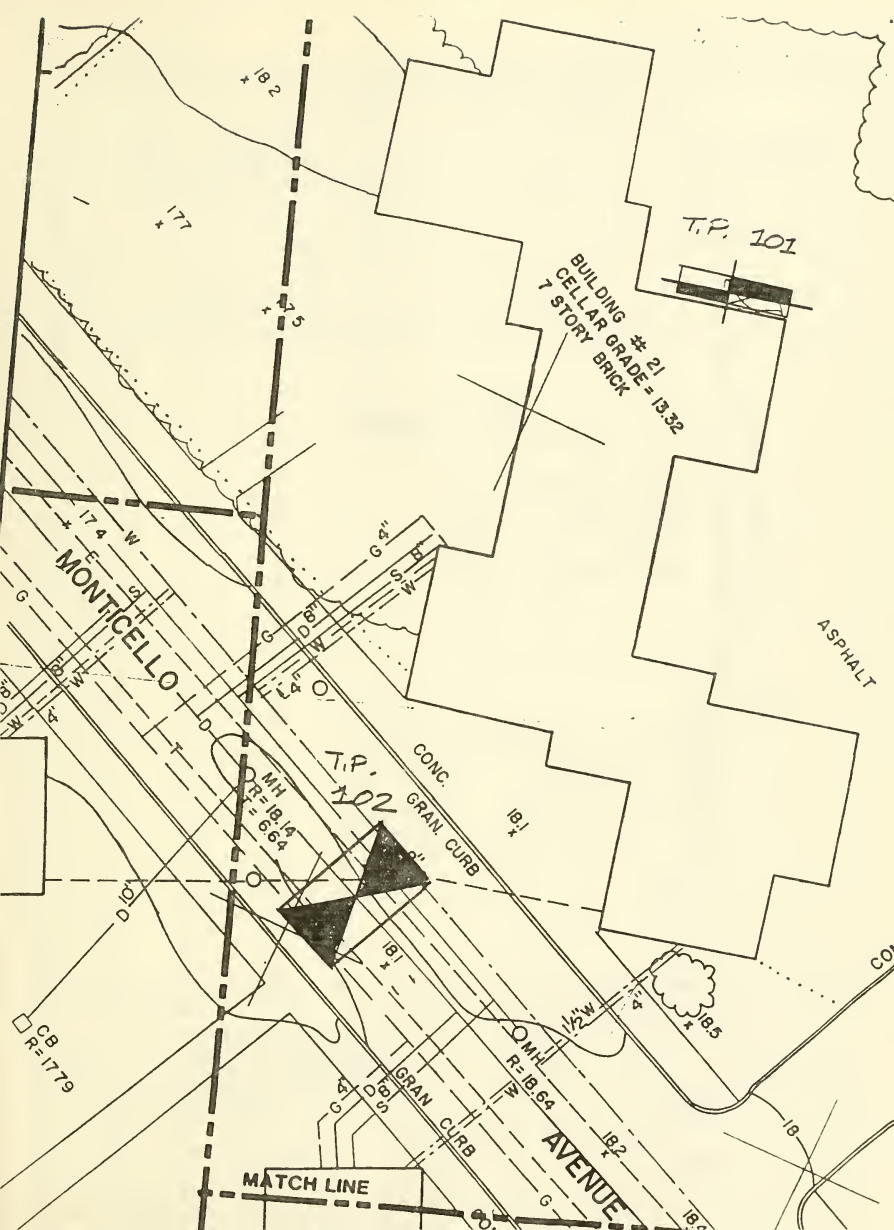
CONSOLIDATION TEST RESULTS

PROJECT : COLUMBIA POINT HOUSING
LOCATION : DORCHESTER, MA
BORING : B-1 SAMPLE : 4-5 DEPTH : 157'
SOIL : MEDIUM GREY SILTY CLAY, TRACE FINE SAND
INITIAL THICKNESS (INCHES) : 1"



FIGURE

APPENDIX II


T.P. 101
BUILDING # 21
CELLAR GRADE = 13.32
7 STORY BRICK
ASPHALT
MONTICELLO
AVENUE
T.P. 102
CONC.
GRAN. CURB
MH
R = 18.14
I = 6.64
MH
R = 18.64
CB
R = 17.79
MATCH LINE
182
177
175
174 W
181
185
182

REPORT OF TEST PIT TP-101

PROJECT: HARBOR POINT, DORCHESTER, MA

CLIENT: CMJ DATE: 6/28/85

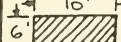
CONTRACTOR/EQUIPMENT: A.A. WILL / C 235

ELEVATION/DATUM: 18± SHEET 1 OF 1

DEPTH (FT.)	SAMPLE NO.	SAMPLE DEPTH	STRATA PLOT	DESCRIPTION	REMARKS
2					
0				GROUND SURFACE	
				BIT. CON.	
2				FILL: LOOSE, CAVING ASHES, CINDERS, WOOD, BRICK, ROCK, GLASS, METAL, CABLE, PIPE, PAPER, SOIL	FOUNDATION WALL
4					
6					
8					
10					
12					PILE CAP
14				PILE: UNTREATED TIMBER WITH BARK 12" to 14" IN DIAMETER. APPEARS TO BE IN EXCELLENT CONDITION.	
16					
18					TIMBER PILE
20					
22					
24					

GROUNDWATER		
DATE	TIME	DEPTH
6/28		13'±
	(HW @ ≈ -10½)	
NOT ENCOUNTERED		

TEST PIT PLAN



PROPORTIONS	
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

EXC EFFORT

EASY
MODERATE
DIFFICULT

ENGINEER: M. PENNEY

JOB NO. : 843753

SCALE : 1" = 5'

Geotechnical of Massachusetts Inc Consultants

REPORT OF TEST PIT TP-102

PROJECT: HARBOR POINT, DORCHESTER, MA

CLIENT: CMJ DATE: 6/28/85

CONTRACTOR/EQUIPMENT: A.A. WILL / C 235

ELEVATION/DATUM: 18± SHEET 1 OF 1

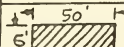
DEPTH (FT.)	SAMPLE NO.	SAMPLE DEPTH	STRATA PLOT	DESCRIPTION	REMARKS
1				FILL: Compact Brown c-f+ SAND, Little GRAVEL, LITTLE CLAYEY SILT; COBBLES	
2					
3					
4					
5				UTILITIES	
6				• 8"CI WATER @ -4'	
7				• 12"x12" CONCRETE CONDUIT FOR TELEPHONE @ -3'6"	
8				• 18"x 24" CONCRETE CONDUIT FOR ELECTRIC @ -3'	
9				• 6" STEEL GAS LINE @ -4'	
10				• SEWER AND DRAIN PIPE VIEWED FROM MH @ -11' INV	
11					
12				ALL UTILITIES APPEAR TO BE IN GOOD CONDITION	
13					
14					

GROUNDWATER

DATE	TIME	DEPTH
6/28		

NOT ENCOUNTERED ×

TEST PIT PLAN



PROPORTIONS

TRACE 0-10%
LITTLE 10-20%
SOME 20-35%
AND 35-50%

EXC EFFORT

EASY
MODERATE
DIFFICULT

ENGINEER: M. PENNEY

JOB NO. : 843753

SCALE : 1"=2½'

Geotechnical of Massachusetts Inc. Consultants

APPENDIX III

Geotechnical
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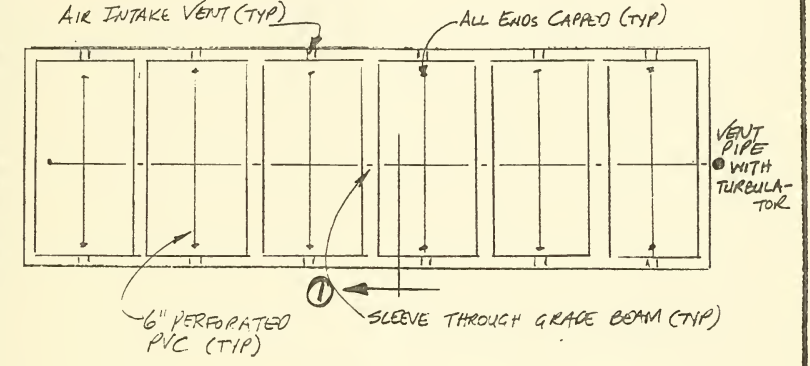
Consultants
(617) 685-4800

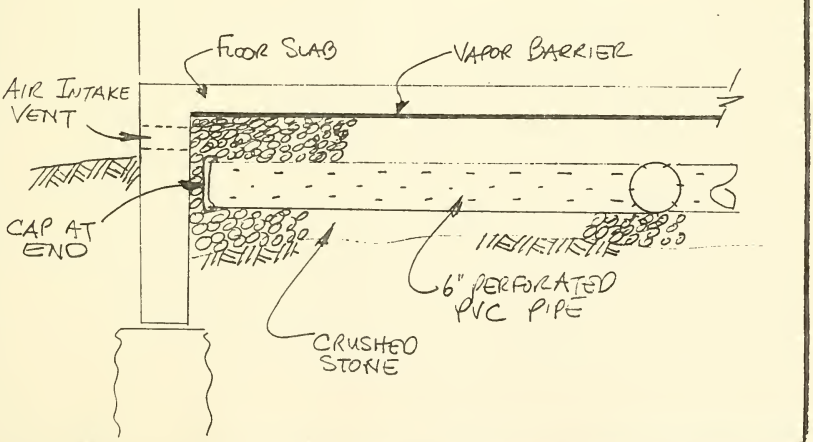
PROJECT HARBOR POINT
BY SOG DORCHESTER, MA

DATE 7/16/85 SHEET 1 OF 1
JOB NO. 843753 SCALE

METHANE

PROPOSED VENTING SYSTEM





APPENDIX H

GROUNDWATER SAMPLING

AND

ANALYSIS PROGRAM

NEW ENGLAND RESEARCH, INC.
15 SAGAMORE ROAD
WORCESTER, MASSACHUSETTS 01605
TELEPHONE: (617) 752-0346

GROUNDWATER SAMPLING AND ANALYSIS PROGRAM COLUMBIA POINT REVITALIZATION PROJECT

SUBMITTED TO

UNIVERSAL ENGINEERING CORPORATION

100 BOYLSTON STREET

BOSTON, MASSACHUSETTS 02116

DECEMBER 13, 1983

Environmental Consulting Services

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2. FIELD SURVEYS

2.1 Boring Program

The boring program for the Columbia Point Revitalization Project included ten test borings for both sediment and groundwater samples. Details of the sediment sampling program are included in a separate report.

2.2 Collection of Water Samples

Groundwater samples were collected at each of the ten test boring sites during the period October 27 through October 31, 1983. Figure 2-1 includes the test boring locations; these locations may be summarized as follows:

- Site No. 83-01 (test well installed)
 Northeast corner of the housing project, just onshore.
- Site No. 83-02
 Edge of service road near beach area, east of housing project.
- Site No. 83-03
 Southeast corner of the housing project, at Monticello Avenue.
- Site No. 83-04
 Edge of baseball diamond, next to building.
- Site No. 83-05
 Edge of service road near basketball courts.

1. INTRODUCTION AND STATEMENT OF OBJECTIVES

The Boston Redevelopment Authority (BRA) is considering several optional plans under the Columbia Point Revitalization Project. One proposal includes the creation of an aquatic environment by the use of tidal basins. During assessments and discussions of the proposed tidal basins, the alternative of creating freshwater impoundments/wetlands was also considered. A freshwater aquatic environment, however, would require a water supply. Groundwater was considered as a possibility. Also, any future construction must take into consideration whether hazardous wastes exist at the project site.

The objectives of this study were to conduct a groundwater sampling and analysis program to determine: (1) if the groundwater indicates hazardous waste at the site, and (2) if the contaminants in the groundwater would be potentially harmful to freshwater aquatic life. This study was conducted in coordination with the BRA, the Massachusetts Department of Environmental Quality Engineering (DEQE), Universal Engineering Corporation and Haley and Aldrich, Inc.



Figure 2-1. Location of Test Bore Sites.

- Site No. 83-06 (test well installed)
 Northeast parking area, off Monticello Avenue.
- Site No. 83-07
 Northwest parking area, at Monticello Avenue
- Site No. 83-08
 Midsection of Montpelier Road, at parking area.
- Site No. 83-09 (test well installed)
 Southwest corner of the housing project, at Monticello Avenue.
- Site No. 83-10
 Intersection of Brandon Avenue and Blair Road.

Groundwater samples were collected using a previously steam-cleaned, stainless steel bailer. Between each test boring, the bailer was hand cleaned and then rinsed, first with distilled water and then with methanol. Water samples were collected from each boring site for the analysis of volatile organic priority pollutants, acetone, methylethyl ketone, methylisobutyl ketone, xylene, total iron and manganese, and the eight metals, four pesticides and two herbicides included in the EP toxicity test (see Section 3). Samples were also collected for the algal bioassay (see Section 4) and for pH determinations. In addition, a water sample from each test boring location was analysed on site for temperature, specific conductivity and salinity. All water samples were iced and transported to the laboratory in coolers.

3. WATER QUALITY ANALYSES

3.1 Introduction

The water samples collected from the 10 test bore sites (see Section 2) were analyzed for selected parameters, with emphasis on metals and organic priority pollutants.

The primary objective of the water quality analyses was to determine if the groundwater contained contaminants which would indicate hazardous materials in the landfill at the Columbia Point project site.

An additional objective was to determine which contaminants were present in sufficiently high concentrations to cause potential toxic effects on aquatic organisms.

The groups of parameters which were analyzed in each sample were as follows:

1. The eight metals included in the EP Toxicity test of the U.S. EPA.
2. The six pesticides included in the EP Toxicity test of the U.S. EPA.
3. The volatile organic compounds on the list of priority pollutants issued by the U.S. EPA.

4. Four additional organic compounds requested by the Massachusetts Division of Environmental Quality Engineering (DEQE):

 (1) Acetone
 (2) Methylethyl ketone
 (3) Methylisobutyl ketone
 (4) Xylene

5. Iron and manganese, also requested by the DEQE.

The groundwater samples collected from the test bores had suspended solids in them. In the case of the EP Toxicity tests, the analyses were performed on composite samples made up of (1) the filtered groundwater sample, and (2) the aqueous solution used to extract the solid material using the standard extraction procedure of the EP Toxicity test.

In addition to the analyses for organic chemicals and metals, selected physical parameters were measured in each sample. These parameters are included in the next section.

3.2 Results

The results of the water quality tests are shown in Tables 3-1, 3-2 and 3-3 and in the Appendixes.

The results of selected physical parameters measured in the 10 groundwater samples are summarized in Table 3-1. The

Sampling Site	Temperature in °C	pH in pH units	Specific Conductance in μmhos/cm	Salinity in °/oo
83-01	11	7.1	11,000	9
83-02	14	7.2	4,300	3
83-03	11	7.1	2,400	2
83-04	12	6.5	8,000	6.5
83-05	14	8.1	5,500	4
83-06	17	7.3	1,400	1
83-07	19	7.2	6,000	7
83-08	16	7.1	500	0.4
83-09	17	7.0	2,000	1.2
83-10	17	7.3	1,500	1

Table 3-1. Selected Physical Parameters Measured in the Groundwater Samples.

Parameter Groups	Results of Analyses
Eight metals in EP Toxicity test	Traces of arsenic in 7 samples Traces of barium in 8 samples Traces of cadmium in 10 samples Traces of chromium in 8 samples Traces of lead in 5 samples No traces of mercury, selenium or silver above detection limits
Eight pesticides in EP Toxicity test	Trace of toxaphene in 1 sample Trace of 2, 4-D in 1 sample Trace of 2,4,5-TP Silvex in 1 sample No traces of endrin, lindane, or methoxychlor above detection limits
Volatile organic pollutants	None detected above detection limits
Other organic compounds	None detected above detection limits
Iron and manganese	Iron detected in 10 samples Manganese detected in 10 samples

Table 3-2. Results of Analyses for Metals and Organic Chemicals.

Parameters	Values of Analytical Tests	Units
Arsenic	0.014, 0.005, 0.007, 0.006, 0.006, 0.005, 0.011	mg/l
Barium	1.9, 0.12, 0.055, 0.094, 1.5, 1.0, 0.46, 0.020	mg/l
Cadmium	0.018, 0.003, 0.002, 0.018, 0.006, 0.009, 0.014, 0.17, 0.010	mg/l
Chromium	0.005, 0.005, 0.007, 0.012, 0.007, 0.034, 0.005, 0.006	mg/l
Lead	0.17, 0.082, 1.1, 0.93, 0.011	mg/l
Toxaphene	6.9	µg/l
2,4-D	17	µg/l
2,4,5-TP Silvex	40	µg/l
Iron	731, 1930, 1710, 588, 3040, 3330, 2740, 3090, 3000, 2920	mg/l
Manganese	6.9, 15.3, 14.6, 7.0, 21.3, 15,4, 16.7, 20.1, 23.4, 21.6	mg/l

Table 3-3. Summary of Values for Various Metals and Pesticides Detected in the Groundwater Samples.

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WORCESTER, MASSACHUSETTS

pH values indicate that the water samples tended to be slightly alkaline. The results also show evidence of moderately high specific conductance and salinity values. Although the values among the sites varied considerably, there was generally good correlation between specific conductance and salinity for individual sites.

The results of the tests for organic chemicals and metals are summarized in Table 3-2. With the exception of occasional traces of some pesticides, the levels of organic compounds were below the detection limits. Traces of heavy metals, however, were rather widespread throughout the project site. Iron and manganese were found consistently in all samples.

The numerical values for the analyses of the metals in the EP Toxicity test are shown in the Appendixes and are summarized in Table 3-3. The values for the pesticides detected in the samples are also shown in Table 3-3.

3.3 Discussion

Evaluation of the physical parameters for the groundwater collected at the various sites indicates that the highest

values for specific conductance and salinity were found at the sites nearest Dorchester Bay. This finding is consistent with the intrusion of some seawater into the ground nearest the shoreline. The highest value, for example, indicates that seawater is approximately one-fourth of the groundwater mass at Station 83-01.

The values for the three pesticides detected (see Table 3-3) are relatively low (all below 0.1 mg/l). These values are lower than those required to meet the characteristic of EP Toxicity under the U.S. EPA hazardous waste regulations (40 CFR 261.24).

The values for the four heavy metals were also relatively low. For example, of the 37 values for the analytical tests above detection limits, the majority of the values were below 0.1 mg/l. All values were lower than those required to meet the characteristic of EP Toxicity under the U.S. EPA hazardous waste regulations.

It is important to note that the pH values for the groundwater samples were slightly alkaline (see Table 3-1), with one exception (83-04). The EP Toxicity test is conducted at a slightly acid pH. It is possible that if the groundwater

were more acidic there would be higher concentrations of contaminants leaching from the solid material at the site into the groundwater.

The other issue in this study centered on whether any contaminants present in the groundwater would be potentially harmful to aquatic life. Using the Quality Criteria for Water published by the U.S. EPA (1976) as a guide, it is unlikely that the concentrations of most heavy metals present in the groundwater samples would be toxic to freshwater aquatic life (see Table 3-3). One important exception is with cadmium. The levels of cadmium are sufficiently high to cause adverse effects on sensitive aquatic species. Although no specific numerical criteria for lead are included in the 1976 criteria, the levels of lead in the groundwater may also be toxic to sensitive species.

The levels of pesticides which were detected were generally low. However, the amount present in the one sample which contained toxaphene could be toxic to aquatic life (EPA, 1976). The levels of herbicides (2,4-D; 2,4,5-TP) are unlikely to be harmful to aquatic life. Moreover, their persistence in the environment is relatively short (weeks to months) compared to

the more persistent pesticides (Pimentel, 1971).

Both iron and manganese were present in relatively high values in all 10 samples. This was especially true with iron (see Table 3-3). The levels of iron in the groundwater at the project site are well above the value in the criteria for protection of aquatic life. The values of manganese are also high for groundwater and could be harmful to sensitive organisms.

SECTION 4. BIOASSAY

4.1 Introduction

Waters collected from each of the 10 test boring sites were used in an algal bioassay to determine the effects of test bore waters on algal growth. Algal bioassays are effective means of detecting chemicals in water which may suppress or enhance algal growth.

Suppression of algal growth may be due to the action of toxic chemicals and/or of other growth inhibitors. Toxic chemicals are those that directly interfere with the metabolism of a living cell through chemical interaction with key cellular constituents. Growth inhibitors may not be toxic, but may nonetheless suppress growth indirectly. For example, a growth inhibitor may cause an essential cell nutrient to become unavailable to a cell due to chelation (i.e., chemical combination) of the nutrient by the inhibitor.

Growth enhancement may also occur through different direct and indirect mechanisms. For example, cellular growth in a natural system may be directly enhanced through the addition of nutrients. Cellular growth may also be indirectly enhanced due to the chelation of toxic chemicals or other growth inhibitors.

The bioassay in this study was designed solely to detect the suppression or enhancement of algal growth due to the addition of test bore waters to a standard algal growth medium. It was not designed to distinguish between the various possible direct and indirect mechanisms of growth suppression or enhancement.

4.2 Methods

Samples of test bore waters were iced prior to processing in the laboratory. Within one week of collection, the pH of coarsly filtered aliquots of each sample was adjusted to pH = 7. Each aliquot was then filter sterilized using acetate membrane filters with a pore diameter of 0.45 μ. After filtration aliquots were stored in the dark.

The bioassay was initiated on November 19, 1983. The design of this assay was based on The Selenastrum Capricornutum Printz Algal Assay Bottle Test: Experimental Design, Application, and Data Interpretation Protocol (Miller et al., 1978).

Culture flasks were 125 ml Erlenmeyer flasks which had been acid cleaned, rinsed, stoppered with foam plugs and autoclaved. Culture flasks were divided into control and test

flasks. All culture flasks contained a concentrated aliquot of basal algal medium (BAM) which, diluted to 25 ml, is an ideal growth medium for Selenastrum capricornutum Printz. The dilution of BAM in control and test flasks to a final volume of 25 ml was accomplished through the additions of autoclaved distilled water and/or test bore water, and autoclaved distilled water containing a suspension of washed algal cells. All flasks were initially inoculated with algal suspensions which yielded a density of approximately 66,000 cells per ml of the final flask volume of 25 ml.

Triplicate control flasks were brought to the final volume of 25 ml through the addition of autoclaved distilled water. Test flasks for each test water sample were subdivided into three dilution series; triplicate flasks in each series (Series A, B and C) were brought to final volume through the addition of different volumes of test bore water and/or autoclaved distilled water. For Series A of each test bore water sample, 8% of the final volume was test bore water; for Series B, 28% was test bore water; and for Series C, 96% was test bore water.

It should be noted that this experimental design incorporates different concentrations of each test bore water in

order to determine the effect of concentration of test bore water on growth suppression and/or enhancement. A summary of the overall design of the bioassay is included in Table 4-1. A summary of the number of flasks for each sample is included in Table 4-2.

Upon inoculation, all flasks (total flasks = 93) were placed in a closed growth chamber and received constant illumination from beneath at ambient room temperature. Cell counts in one control flask and in one flask of the triplicate Series A flasks for each test bore water sample were periodically monitored to determine growth rates throughout the period of incubation. Cell counts were obtained by direct microscopic counts of viable cells using a nannoplankton cell (EPA, 1975). Upon completion of the incubation period, cell counts were obtained for all control and test flasks by means of the same counting method. Determination of dry weights in each flask was not made due to the small volume in each flask. Previous experience with bioassays indicates that the experimental error in weighing filtrates of such small volumes is often greater than estimates of biomass. Also it was clear that there was substantial precipitation of crystalline materials in some of the flasks during the period of incubation. Such precipitates

Flasks[1]	Series[2]	Additions to Flasks				Total Volume (ml)	Well Water as % of Total
		BAM[3] (ml)	ADW[4] (ml)	TWW[5] (ml)	AS[6] (ml)		
Control	None	0.7	24	0	0.3	25	0%
Test	A	0.7	22	2	0.3	25	8%
	B	0.7	17	7	0.3	25	28%
	C	0.7	0	24	0.3	25	96%

1 One triplicate set of control flasks; triplicate test flasks for each of 3 dilution series for each of 10 test bore water samples.

2 No dilution series of control flasks; 3 dilutions of test bore water for each of 10 test bore water samples

3 BAM: Basal Algal Medium, as described in Miller et al., 1978.

4 ADW: Autoclaved, distilled water.

5 TWW: Test well water; pH adjusted and filter sterilized.

6 AS: Algal suspension, using autoclaved distilled water and washed algal cells.

Table 4-1. Summary of Bioassay Design.

Test Sample	Number of Flasks			
	Series A (8%)	Series B (28%)	Series C (96%)	Total
Control	NA	NA	NA	3
83-01	3	3	3	9
83-02	3	3	3	9
83-03	3	3	3	9
83-04	3	3	3	9
83-05	3	3	3	9
83-06	3	3	3	9
83-07	3	3	3	9
83-08	3	3	3	9
83-09	3	3	3	9
83-10	3	3	3	9
Total	30	30	30	93

Table 4-2. Summary of the Number of Flasks Used for Each Test Element.

would, of course, prevent an accurate gravimetric determination of algal biomass.

4.3 Results

The first step in conducting an algal bioassay is to determine the duration of the incubation period for control and test flasks. The incubation period should be sufficiently long for the bioassay organism to achieve maximum population density. Cell counts in monitor flasks (single control flask and single test flasks in Series A) were used to determine the duration of the incubation period.

Cell counts and daily growth rates observed in the monitor flasks are included in Table 4-3. As shown in Table 4-3, growth rates in most monitor flasks reached maximum values in the period November 28 - December 2 (i.e., after 9-13 days of incubation). Growth rates in monitor flasks for test bore water sample Nos. 1 and 10 reached maximum values within 2 days of incubation; the growth rate in the monitor flask for test bore water sample No. 5 was essentially zero throughout the incubation.

Figure 4-1 depicts the growth curves observed in monitor flasks for control (containing no test bore water) and test flasks WS #01 and WS #05 (containing 8% test bore water sample

	21 NOV 83		23 NOV 83		26 NOV 83		28 NOV 83		01 DEC 83		02 DEC 83	
#1 FLASK	#2 VCC	#3 DGR	VCC	DGR	VCC	DGR	VCC	DGR	VCC	DGR	VCC	DGR
CONTR	5.0	+ 29	5.2	+ 29	5.1	- 7	5.3	+ 29	6.4	+ 386	6.4	0
WS#01	5.2	+ 76	5.3	+ 13	5.3	0	5.5	+ 29	5.9	+ 50	5.9	0
WS#02	4.9	+ 13	4.9	0	5.0	+ 9	5.3	+ 50	5.8	+ 72	5.7	- 21
WS#03	4.9	+ 13	5.1	+ 29	5.2	+ 9	5.5	+ 50	6.3	+ 177	6.3	0
WS#04	5.1	+ 50	5.3	+ 29	5.8	+ 72	6.2	+ 76	6.4	+ 19	6.4	0
WS#05	4.8	0	4.9	+ 13	4.9	0	4.9	0	4.9	0	4.9	0
WS#06	5.2	+ 76	4.8	- 30	5.4	+ 99	5.5	+ 13	6.3	+ 177	6.2	- 21
WS#07	5.1	+ 50	5.0	- 10	5.1	+ 9	6.0	+ 347	5.3	- 27	5.4	+ 26
WS#08	5.2	+ 76	5.1	- 10	5.3	+ 19	5.5	+ 29	6.3	+ 177	6.3	0
WS#09	5.1	+ 50	5.1	0	5.4	+ 33	5.7	+ 50	6.2	+ 72	6.5	+ 100
WS#10	5.2	+ 76	5.4	+ 29	5.9	+ 72	6.2	+ 50	6.4	+ 19	6.5	+ 26

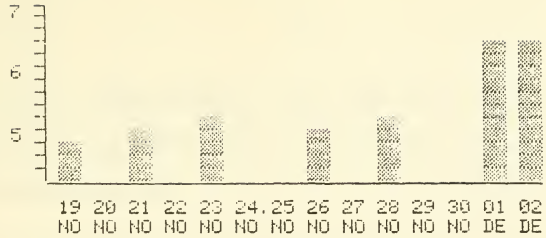
LEGEND:

#1 CONTR=CONTROL FLASK #1;WS#01=WATER SAMPLE FROM TEST BORE NO.1,ETC.

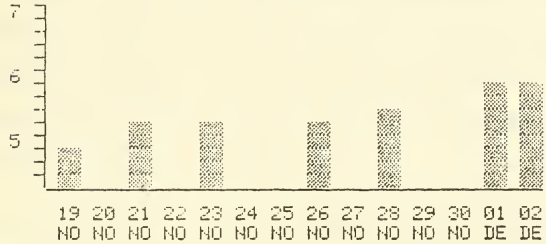
#2 VCC=LOG OF VIABLE CELL COUNTS/ML (TO NEAREST .1 LOG UNIT)

#3 DGR=PERCENT INCREASE/DECREASE IN CELL COUNT PER DAY IN INTERVAL SINCE LAST COUNT. INITIAL CELL COUNT ON NOV.19 WAS 66,000 PER ML

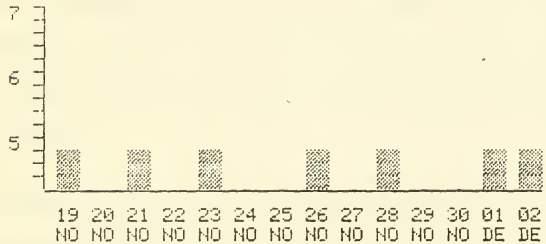
TABLE 4-3. CELL COUNTS IN MONITOR FLASKS



(A) CONTROL FLASK (NO TEST WATER)



(B) WS#01 FLASK (CONCENTRATION = 8%)



(C) WS#05 FLASK (CONCENTRATION = 8%)

NOTE: VERTICAL AXIS = LOG OF COUNT/ML

FIGURE 4-1. SELECTED GROWTH CURVES

Nos. 1 and 5, respectively). These growth curves are representative of the types of growth curves observed during the incubation period.

Because population densities in all monitor flasks had either already attained or were approaching maximum values on December 2, incubation of all control and test flasks was terminated on December 2 (13 days after inoculation of flasks). Cell counts were then made for all flasks for purposes of comparing maximum population densities.

Cell counts in all flasks at the completion of the bioassay are summarized in Table 4-4. Table 4-4 also includes basic statistics describing triplicate cell counts for control and test flasks, as well as the percent suppression or enhancement in each test series with respect to the mean cell count in the control series.

With regard to the data included in Table 4-4, it is important to note the following:

(1) The nannoplankton counting cell is designed for use at relatively high magnification (430X). Because of this, the average number of cells observed in a series of 10 microscopic fields must be multiplied

SOURCE	DL	FLASK #1	#2	#3	MEAN	S.D.	95% CONF. INT.			S/E
CONTR	0%	6.40	6.48	6.41	6.43	5.44	6.31	TO	6.53	NA
WS#01	8%	5.94	6.17	6.21	6.12	5.61	5.49	TO	6.37	- 51%
WS#01	28%	5.23	4.82	6.38	5.95	6.13	<0	TO	6.62	- 67%
WS#01	96%	3.51	3.98	3.90	3.84	3.52	<0	TO	4.18	- 100%
WS#02	8%	5.72	5.76	4.74	5.59	5.46	<0	TO	6.04	- 86%
WS#02	28%	4.59	4.84	4.76	4.74	4.19	4.23	TO	4.97	- 98%
WS#02	96%	4.71	4.87	4.72	4.77	4.10	4.45	TO	4.96	- 98%
WS#03	8%	6.30	6.45	6.36	6.37	5.62	6.12	TO	6.53	- 12%
WS#03	28%	5.42	4.97	4.86	5.15	5.01	<0	TO	5.60	- 95%
WS#03	96%	4.38	4.51	4.70	4.55	4.12	3.43	TO	4.83	- 99%
WS#04	8%	6.38	6.52	6.45	6.46	5.65	6.24	TO	6.60	+ 6%
WS#04	28%	5.06	5.69	6.63	6.21	6.36	<0	TO	6.86	- 40%
WS#04	96%	4.05	3.98	4.68	4.36	4.34	<0	TO	4.89	- 99%
WS#05	8%	4.90	5.85	6.24	5.92	5.92	<0	TO	6.46	- 69%
WS#05	28%	4.99	5.01	4.94	4.98	3.92	4.88	TO	5.07	- 96%
WS#05	96%	4.70	4.79	6.05	5.61	5.79	<0	TO	6.29	- 85%
WS#06	8%	6.22	6.33	6.25	6.27	5.39	6.10	TO	6.39	- 31%
WS#06	28%	4.32	4.60	4.64	4.54	4.09	3.66	TO	4.81	- 99%
WS#06	96%	4.55	4.11	4.44	4.40	4.06	<0	TO	4.73	- 99%
WS#07	8%	5.40	5.18	6.19	5.81	5.90	<0	TO	6.42	- 76%
WS#07	28%	4.57	4.79	5.02	4.83	4.53	<0	TO	5.18	- 98%
WS#07	96%	3.51	3.51	3.98	3.73	3.57	<0	TO	4.16	- 100%
WS#08	8%	6.29	6.29	6.43	6.34	5.63	6.05	TO	6.51	- 19%
WS#08	28%	5.76	4.55	5.07	5.39	5.47	<0	TO	5.99	- 91%
WS#08	96%	5.08	4.35	5.05	4.93	4.73	<0	TO	5.34	- 97%
WS#09	8%	6.50	6.52	6.47	6.50	5.27	6.43	TO	6.56	+ 16%
WS#09	28%	6.42	6.40	6.40	6.41	4.93	6.37	TO	6.44	- 6%
WS#09	96%	5.98	5.84	5.89	5.90	5.12	5.68	TO	6.05	- 70%
WS#10	8%	6.49	6.46	6.41	6.45	5.39	6.35	TO	6.54	+ 5%
WS#10	28%	6.50	6.35	6.44	6.43	5.67	6.19	TO	6.59	+ 1%
WS#10	96%	6.20	4.65	4.76	5.75	5.94	<0	TO	6.44	- 79%

NOTE: CELL COUNTS/ML AND BASIC STATISTICS ARE GIVEN TO NEAREST .01 LOG UNIT. STATISTICS BASED ON ACTUAL COUNTS/ML.

LEGEND:

DL=CONCENTRATION OF BORE WATER SAMPLE
S.D.=STANDARD DEVIATION
S/E=SUPPRESSION(-) OR ENHANCEMENT(+)OF GROWTH BASED ON COMPARISON OF MEAN OF TEST WITH MEAN OF CONTROL FLASKS

TABLE 4-4. CELL COUNTS AT COMPLETION OF BIOASSAY

by a large factor (16,068) to obtain final cell counts per ml. Thus, even small variations in counted cells in triplicate flasks result in relatively high standard deviations.

(2) In addition to the unavoidable experimental error identified above, it is clear that a number of individual flasks showed anomolous growth when compared to other flasks within the same set of triplicates. For example, the cell count in flask No. 3 of WS #01 (28% dilution) was approximately 1½ log units greater than the cell count in flask No. 2 in the same set of triplicates. Such anomolous counts are referred to as "outliers" and are often discarded in the statistical analysis of data. However, as noted by Miller et al. (1978), extreme caution should be exercised in discarding outliers, since they may often indicate important phenomena which may otherwise be overlooked. In a bioassay involving both microbial populations and potentially toxic chemicals, it is important to note that anomolous growth among triplicate cultures may result from natural variation of resistence to toxicity within the tested populations. Because

this phenomenon is intrinsic to the use of microbial populations in bioassays, the anomolous cell counts were retained for purposes of the statistical information included in Table 4-4. The resultant standard deviations therefore resulted in turn in a number of instances in which the lower limit of the 95% confidence interval is less than zero.

Despite the methodological constraints discussed above, the data included in Table 4-4 clearly indicate the following:

(1) With few exceptions, test bore water samples significantly suppressed algal growth. Some enhancement of algal growth was observed at lower concentrations of test bore water (i.e., WS #04, WS #09, and WS #10). The relatively small observed enhancements may or may not have been due to nutrients in the test water samples.

(2) Suppression of algal growth was generally proportional to the concentration of test bore water sample in the algal growth medium.

It should also be noted that microscopic examination of cells in all test flasks containing 28% or 96% of test bore water samples revealed cells to be highly pleomorphic (i.e., having altered shape), highly granulated, and bleached. This is commonly observed in instances of metallic poisoning.

In order to compare the relative suppression of algal growth by the different test bore water samples, it is useful to determine the concentration of test bore water samples necessary to achieve a 50% suppression of growth. This concentration may be referred to as "concentration for 50% suppression" and is denoted here as SC_{50}.

The SC_{50} for a test bore water sample may be extrapolated from the suppression/enhancement data derived for each dilution of that water sample. It should be noted that this extrapolation can be applied to obtain only a roughly approximate value of SC_{50} in the case of four test bore water samples which exceeded 50% suppression at the lowest concentration used (WS #05, and WS #07). Values of SC_{50}, in rank order are included in Table 4-5. In Table 4-5, values of SC_{50} are given to the nearest 5%.

Rank[1]	Test Bore Water Sample	Approximate SC_{50}[2]	Relative Suppression[3]
1	WS #02	5%	15
1	WS #05	5%	15
1	WS #07	5%	15
2	WS #01	10%	7.5
2	WS #06	10%	7.5
3	WS #08	15%	5
4	WS #03	20%	3.8
5	WS #04	35%	2.1
6	WS #09	65%	1.2
7	WS #10	75%	1

Legend:

1: Rank order is from lowest SC_{50} (greatest suppression) to highest SC_{50} (lowest suppression).

2: SC_{50} is the concentration at which there is a 50% suppression of growth relative to control; all SC_{50} values are given to nearest 5%.

3: Relative suppression is the SC_{50} normalized against the SC_{50} of WS # 10.

Table 4-5. Comparison of SC_{50} Values among Test Bore Water Samples.

As indicated in Table 4-5, the strongest suppression was noted in Samples WS #02, WS #05, and WS #07 (these samples have the lowest SC_{50}). The weakest suppression was noted in sample WS #10, which has the highest SC_{50}. Table 4-5 also compares the SC_{50} of each water sample to the SC_{50} of WS # 10. Thus, WS #02 has an SC_{50} which is 15 times greater than the SC_{50} of WS #10. In other words, it takes a concentration of WS #10 which is 15 times greater than that of WS #02 to achieve the same effect of a 50% suppression in algal growth.

4.4 Discussion

In a bioassay, the presence of toxic or other inhibitory chemicals is indicated by a proportional relationship between the concentration of those chemicals and the magnitude of growth suppression. The bioassay conducted on the ten test bore water samples collected from Columbia Point shows a proportional relationship between the concentration of all ten test bore water samples and the magnitude of growth suppression. Thus, we conclude that all ten test bore water samples contain chemicals which are toxic or otherwise inhibitory to the bioassay organism, Selenastrum capricornutum Printz.

The concentrations of groundwater sample in the algal medium which resulted in significant suppression of algal growth

varied greatly among the 10 test sites. The lowest concentration required to achieve a 50% suppression was about 5%; the highest concentration required to achieve a 50% suppression was about 75%. In general, test samples which were most suppressive of algal growth were collected from the northern periphery of the Columbia Point project area; those which were least suppressive of algal growth were collected from the southern periphery of the project area (Figure 4-2).

Despite the great variation in relative suppressive strength of the tested water samples, it is important to note that all ten test bore waters could be expected to result in at least 79% suppression of the growth of the bioassay organism at full strength. Because the bioassay organism is representative of a major taxon of phytoplankton that is typically found in freshwater ponds and lakes, it is probable that a similar suppressive effect on algal growth would be observed if any of the tested waters was used as the major water source for a constructed impoundment in the project area.

Finally, three of the tested waters (WS #4, WS #9, WS #10) demonstrated an enhancement of algal growth in low concentrations (i.e., 8-28%). Each of these waters was collected from the



Figure 4-2. Distribution of SC_{50} Values Among Test Bore Sites.

southern periphery of the project area. It is therefore possible that these source waters may be combined at a suitable concentration with other source water known to be free of any growth inhibitors in order to produce a water quality which would support algal growth.

5. SUMMARY

1. Groundwater samples were collected from 10 test boring locations at the Columbia Point project site. Various physical, chemical and biological tests were conducted on the test samples.

2. The results of the tests of physical parameters indicate groundwater which is slightly alkaline, and which has moderately high values for specific conductance and salinity. Intrusion of seawater is very likely taking place at the site.

3. Analytical tests indicate no levels of volatile organic priority pollutants (EPA list) above the analytical detection limits. The tests also show no levels of four other organic compounds (requested by DEQE) above the detection limits.

4. There were trace amounts of three of the eight pesticides and herbicides included in the EP Toxicity test of EPA. All values were lower than those required to meet the characteristic of EP Toxicity under the hazardous waste regulations.

5. The one value measured for toxaphene indicates a level which could be toxic to aquatic life. The levels of the two herbicides detected are unlikely to be harmful to aquatic life.

6. There were trace amounts of five of the eight heavy metals included in the EP Toxicity test of EPA. All values were lower than those required to meet the characteristic of EP Toxicity under the hazardous waste regulations.

7. Most of the low levels of heavy metals present in the groundwater are unlikely to be harmful to aquatic life. However, the levels of cadmium, and possibly some of the levels of lead, may be toxic to sensitive aquatic species.

8. Iron and manganese were found consistently in all 10 samples of groundwater. The levels of these two contaminants were high, especially the values for iron.

9. The levels of iron in the groundwater are well above the limits in the criteria for the protection of aquatic life. The values of manganese may also be harmful to sensitive aquatic species.

10. The results of the algal bioassay tests indicate that all groundwater samples had some degree of suppression of algal growth when compared with the control tests.

11. Groundwater samples collected from locations nearest the seashore tended to have the greatest degree of suppression of algal growth.

12. Low concentrations of some groundwater samples showed a slight enhancement of algal growth. However, the enhanced growth may not be significant.

REFERENCES

1. Miller, William E., Joseph C. Greene, and Tamotsu Shiroyama. 1978. The Selenastrum Capricornutum Printz Algal Assay Bottle Test: Experimental Design, Application, and Data Interpretation Protocol. Corvallis Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Corvallis, Oregon.

2. Pimentel, David. 1971. Ecological Effects of Pesticides on Non-Target Species. Office of Science and Technology, Executive Office of the President, Washington, D.C.

3. U.S. Environmental Protection Agency,(EPA). Code of Federal Regulations, Title 40. Characteristics of EP Toxicity. (40 CFR 261.24)

4. U.S. Environmental Protection Agency, (EPA). 1975. Plankton Analysis Training Manual. Office of Water Programs, National Training Center, U.S. Environmental Protection Agency, Cincinnati, Ohio.

5. U.S. Environmental Protection Agency,(EPA). 1976. Quality Criteria for Water. U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX: WATER QUALITY DATA

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CONSULTING ENGINEERS
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(207) 775-5401 TELEX 94-4329

REPORT OF ANALYSIS
REFERENCE NUMBER 740

DATE 12/01/83
PAGE 1

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
83-01	11/02/83			
3306002	IRON.TOTAL	MG/L		731
	MANGANESE.TOTAL	MG/L		6.9
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		78 62
	BENZENE-D3	%		106 100
	2-BROMO-1-CHLOROPROPANE	%		84 86
	1.4-DICHLOROBUTANE	%		58 47
	P-BROMOFLUOROBENZENE	%		84 78
	1.2-DICHLOROETHANE-D4	%		71 73
	EP EXTRACTION-ARSENIC	MG/L		0.014
	EP EXTRACTION-BARIUM	MG/L		1.9
	EP EXTRACTION-CADMIUM	MG/L		0.018
	EP EXTRACTION-CHROMIUM	MG/L		0.005
	EP EXTRACTION-LEAD	MG/L		0.17
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
83-02	11/02/83			
3306003	IRON.TOTAL	MG/L		1930
	MANGANESE.TOTAL	MG/L		15.3
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		51
	BENZENE-D3	%		90
	2-BROMO-1-CHLOROPROPANE	%		82
	1.4-DICHLOROBUTANE	%		44
	P-BROMOFLUOROBENZENE	%		70
	1.2-DICHLOROETHANE-D4	%		61
	EP EXTRACTION-ARSENIC	MG/L		0.005
	EP EXTRACTION-BARIUM	MG/L	<	0.005
	EP EXTRACTION-CADMIUM	MG/L		0.003
	EP EXTRACTION-CHROMIUM	MG/L		0.005
	EP EXTRACTION-LEAD	MG/L	<	0.005
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005

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REPORT OF ANALYSIS DATE 12/01/83
REFERENCE NUMBER 740 PAGE 2

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
03-02	11/02/83			
3306003	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
03-03	11/02/83			
3306004	IRON, TOTAL	MG/L		1710
	MANGANESE, TOTAL	MG/L		14.6
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		53
	BENZENE-D3	%		103
	2-BROMO-1-CHLOROPROPANE	%		102
	1.4-DICHLOROBUTANE	%		43
	P-BROMOFLUOROBENZENE	%		95
	1.2-DICHLOROETHANE-D4	%		70
	EP EXTRACTION-ARSENIC	MG/L	<	0.005
	EP EXTRACTION-BARIUM	MG/L		0.12
	EP EXTRACTION-CADMIUM	MG/L		0.002
	EP EXTRACTION-CHROMIUM	MG/L		0.007
	EP EXTRACTION-LEAD	MG/L	<	0.005
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
03-04	11/02/83			
3306005	IRON, TOTAL	MG/L		588
	MANGANESE, TOTAL	MG/L		7.0
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		78
	BENZENE-D3	%		88
	2-BROMO-1-CHLOROPROPANE	%		86
	1.4-DICHLOROBUTANE	%		72

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REPORT OF ANALYSIS DATE 12/01/83
REFERENCE NUMBER 740 PAGE 3

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
83-04	11/02/83			
3306005	P-BROMOFLUOROBENZENE	%		75
	1,2-DICHLOROETHANE-D4	%		64
	EP EXTRACTION-ARSENIC	MG/L	<	0.005
	EP EXTRACTION-BARIUM	MG/L		0.055
	EP EXTRACTION-CADMIUM	MG/L		0.018
	EP EXTRACTION-CHROMIUM	MG/L		0.012
	EP EXTRACTION-LEAD	MG/L	<	0.005
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2,4-D	UG/L	<	10
	EP EXTRACTION-2,4,5-TP SILVEX	UG/L	<	1.0
83-05	11/02/83			
3306006	IRON,TOTAL	MG/L		3040
	MANGANESE,TOTAL	MG/L		21.3
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		79
	BENZENE-D3	%		85
	2-BROMO-1-CHLOROPROPANE	%		93
	1,4-DICHLOROBUTANE	%		48
	P-BROMOFLUOROBENZENE	%		100
	1,2-DICHLOROETHANE-D4	%		86
	EP EXTRACTION-ARSENIC	MG/L		0.007
	EP EXTRACTION-BARIUM	MG/L		0.094
	EP EXTRACTION-CADMIUM	MG/L		0.006
	EP EXTRACTION-CHROMIUM	MG/L		0.007
	EP EXTRACTION-LEAD	MG/L	<	0.005
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2,4-D	UG/L	<	10
	EP EXTRACTION-2,4,5-TP SILVEX	UG/L	<	1.0
83-06	11/02/83			
3306007	IRON,TOTAL	MG/L		3330

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REPORT OF ANALYSIS DATE 12/01/83
REFERENCE NUMBER 740 PAGE 5

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
B-07	11/02/83			
3306008	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
B-08	11/02/83			
3306009	IRON.TOTAL	MG/L		3090
	MANGANESE.TOTAL	MG/L		20.1
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		77
	BENZENE-D3	%		102
	2-BROMO-1-CHLOROPROPANE	%		60
	1.4-DICHLOROBUTANE	%		51
	P-BROMOFLUOROBENZENE	%		81
	1.2-DICHLOROETHANE-D4	%		81
	EP EXTRACTION-ARSENIC	MG/L		0.005
	EP EXTRACTION-BARIUM	MG/L		0.46
	EP EXTRACTION-CADMIUM	MG/L		0.017
	EP EXTRACTION-CHROMIUM	MG/L		0.005
	EP EXTRACTION-LEAD	MG/L		0.93
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
B-09	11/02/83			
3306010	IRON.TOTAL	MG/L		3000
	MANGANESE.TOTAL	MG/L		23.4
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		80
	BENZENE-D3	%		88
	2-BROMO-1-CHLOROPROPANE	%		80
	1.4-DICHLOROBUTANE	%		51
	P-BROMOFLUOROBENZENE	%		86

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REFERENCE NUMBER 740 PAGE 4

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
83-06	11/02/83			
3306007	MANGANESE.TOTAL	MG/L		15.4
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		74
	BENZENE-D3	%		82
	2-BROMO-1-CHLOROPROPANE	%		82
	1,4-DICHLOROBUTANE	%		50
	P-BROMOFLUOROBENZENE	%		95
	1,2-DICHLOROETHANE-D4	%		77
	EP EXTRACTION-ARSENIC	MG/L		0.006
	EP EXTRACTION-BARIUM	MG/L		1.5
	EP EXTRACTION-CADMIUM	MG/L		0.009
	EP EXTRACTION-CHROMIUM	MG/L	<	0.005
	EP EXTRACTION-LEAD	MG/L		0.082
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2,4-D	UG/L		17
	EP EXTRACTION-2,4,5-TP SILVEX	UG/L		40
83-07	11/02/83			
3306009	IRON.TOTAL	MG/L		2740
	MANGANESE.TOTAL	MG/L		16.7
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		80
	BENZENE-D3	%		92
	2-BROMO-1-CHLOROPROPANE	%		88
	1,4-DICHLOROBUTANE	%		51
	P-BROMOFLUOROBENZENE	%		69
	1,2-DICHLOROETHANE-D4	%		65
	EP EXTRACTION-ARSENIC	MG/L		0.006
	EP EXTRACTION-BARIUM	MG/L		1.0
	EP EXTRACTION-CADMIUM	MG/L		0.014
	EP EXTRACTION-CHROMIUM	MG/L		0.034
	EP EXTRACTION-LEAD	MG/L		1.1
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001

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REPORT OF ANALYSIS DATE 12/01/83
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NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
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CLIENT LAB ID	DATE RECEIVED / PARAMETER	UNITS		RESULTS
3-09	11/02/83			
3306010	1.2-DICHLOROETHANE-D4	%		77
	EP EXTRACTION-ARSENIC	MG/L	<	0.005
	EP EXTRACTION-BARIUM	MG/L	<	0.005
	EP EXTRACTION-CADMIUM	MG/L		0.007
	EP EXTRACTION-CHROMIUM	MG/L		0.006
	EP EXTRACTION-LEAD	MG/L	<	0.005
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L		6.9
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
3-10	11/02/83			
3306011	IRON.TOTAL	MG/L		2920
	MANGANESE.TOTAL	MG/L		21.6
	VOLATILE ORGANICS			
	VOLATILE ORGANICS			ND
	VOLATILE SURROGATE RECOVERY			
	BROMOCHLOROMETHANE	%		71
	BENZENE-D3	%		82
	2-BROMO-1-CHLOROPROPANE	%		89
	1.4-DICHLOROBUTANE	%		51
	P-BROMOFLUOROBENZENE	%		92
	1.2-DICHLOROETHANE-D4	%		63
	EP EXTRACTION-ARSENIC	MG/L		0.011
	EP EXTRACTION-BARIUM	MG/L		0.020
	EP EXTRACTION-CADMIUM	MG/L		0.010
	EP EXTRACTION-CHROMIUM	MG/L	<	0.005
	EP EXTRACTION-LEAD	MG/L		0.011
	EP EXTRACTION-MERCURY	UG/L	<	1
	EP EXTRACTION-SELENIUM	MG/L	<	0.005
	EP EXTRACTION-SILVER	MG/L	<	0.001
	EP EXTRACTION-ENDRIN	UG/L	<	0.1
	EP EXTRACTION-LINDANE	UG/L	<	1.0
	EP EXTRACTION-METHOXYCHLOR	UG/L	<	1.0
	EP EXTRACTION-TOXAPHENE	UG/L	<	1.0
	EP EXTRACTION-2.4-D	UG/L	<	10
	EP EXTRACTION-2.4.5-TP SILVEX	UG/L	<	1.0
LANK	11/02/83 VOLATILE ORGANICS			
3306014	VOLATILE ORGANICS			ND

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REPORT OF ANALYSIS
REFERENCE NUMBER 740

DATE 12/01/83
PAGE 7

NEW ENGLAND RESEARCH INC
ATTN: NANCY SUURBALLE
15 SAGAMORE ROAD
WORCESTER MA 01605

CLIENT ID / LAB ID	DATE RECEIVED / PARAMETER	UNITS	RESULTS
BLANK	11/02/83		
3306014	VOLATILE SURROGATE RECOVERY		
	BROMOCHLOROMETHANE	%	89
	BENZENE-D3	%	107
	2-BROMO-1-CHLOROPROPANE	%	80
	1,4-DICHLOROBUTANE	%	57
	P-BROMOFLUOROBENZENE	%	83
	1,2-DICHLOROETHANE-D4	%	82

SIGNATURE Stephen Jussaume for BKW

REPORT TO AUTHORIZATION BRUCE K. ALLEN 8072

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ANALYTICAL LABORATORY SERVICES
VOLATILE ORGANIC PRIORITY POLLUTANTS

STORET NO.	EPA NO.	COMPOUND	METHOD DETECTION LIMIT (µg/ℓ)
34236	4	benzene	0.2
32102	6	carbon tetrachloride	0.6
34301	7	chlorobenzene	5.2
34531	10	1,2-dichloroethane	3.4
34506	11	1,1,1-trichloroethane	1.1
34496	13	1,1-dichloroethane	1.4
34511	14	1,1,2-trichloroethane	1.0
34516	15	1,1,2,2-tetrachloroethane	1
34311	16	chloroethane	1
34576	19	2-chloroethylvinyl ether	2.4
32106	23	chloroform	1.0
34501	29	1,1-dichloroethylene	1.0
34546	30	trans-1,2-dichloroethylene	0.7
34541	32	1,2-dichloropropane	3.2
34561	33	trans-1,3-dichloropropene	2.3
34561	33	cis-1,3-dichloropropene	0.5
34371	38	ethylbenzene	4.3
34423	44	methylene chloride	1.1
34418	45	chloromethane	1
34413	46	bromomethane	1
32104	47	bromoform	4.4
32101	48	bromodichloromethane	1.0
34488	49	trichlorofluoromethane	1
34105	51	dibromochloromethane	0.8
34475	85	tetrachloroethylene	6.0
34010	86	toluene	2.6
39180	87	trichloroethylene	2.6
39175	88	vinyl chloride	1

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REPORT OF ANALYSIS

New England Research
15 Sagamore Road
Worchester, MA 01603

Attn: Nancy Suurballe

Samples Rec'd: November 3, 1983
Data Reported: November 28, 1983
Project No.: 410
Lab No.: 330602-330611

PARAMETER	SAMPLE IDENTIFICATION				
Client	83-01	83-02	83-03	83-04	83-05
Lab	330602	330603	330604	330605	330606
EP Toxicity - Spike Recovery (Percent):					
endrin	35	59	96	61	68
lindane	31	43	69	57	47
methoxychlor	21	40	49	44	39
toxaphene	38	76	93	92	60
2,4-D	41	84	61	56	NS
2,4,5-TP	42	94	68	51	NS

NS = Not Spiked.

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REPORT OF ANALYSIS - PAGE 2 OF 2

PARAMETER		SAMPLE IDENTIFICATION				
	Client	83-06	83-07	83-08	83-09	83-10
	Lab	330607	330608	330609	330610	330611
EP Toxicity - Spike Recovery (Percent):						
endrin		76	53	103	72	62
lindane		42	39	80	50	52
methoxychlor		50	26	48	40	36
toxaphene		66	56	116	87	58
2,4-D		51	35	85	54	62
2,4,5-TP		57	41	83	53	81

Results expressed in mg/l unless otherwise noted.

E.C. JORDAN CO.

Supervisor Stephen A. Turner, Chemist

Supplemental Information

Sampling Site: Unknown

Sampled By: Client

Authorization: N. Suurballe

Analytical Methods
1. Methods for Chemical Analysis of Water and Wastes EPA-600/4-79-020, U.S. Environmental Protection Agency, March 1979
2. Guidelines Establishing Test Procedures for the Analysis of Pollutants, Proposed Regulations **Part III, Federal Register**, Vol 44, No 233, Dec 3, 1979.
3. Others as designated.

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